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EDITORIAL NOTES.

Enhancing the Value of Bye-Products.

JUST lately, we have had two model presidential addresses at meetings of District Associations—the second of them being delivered last week before the Southern Association, by Mr. Thomas Glover, of Norwich; and, like that of Mr. J. G. Newbigging recently, it was remarkable in every sense of the word, and in several ways. It is a good sign, and a salutary thing for the gas industry, that the men who think of the morrow, and not merely of the functions of to-day, are not altogether satisfied with the position of part of the operations, productive and commercial, of the industry's working—particularly in relation to secondary products. Contentment with what exists is not conducive to progress. The methods of the past in connection with the secondary products have been as crude as the products that have been thrown upon the market without much thought as to whether or not commercial values could be improved by raising the intrinsic values at the producing end. But, as sometimes in our own individual affairs there are happenings that abruptly pull us up, and cause us to review and probably change our ways, so in the affairs of business life, there are occurrences which, while regarded as adverse and inconvenient at the time, may be fortunate in other respects, through stimulating investigation, which may promote profitable improvement. There have been of late adverse circumstances both in regard to coal and secondary products; and, partly in consequence of these circumstances, there has been a fairly widespread enlivening of interest to ascertain whether all that could be done is being done in making of the bye-products the best possible. There is a great deal of truth in what Mr. Glover said in the opening part of his illuminating and (may we not say?) fascinating address: "While practically "engaged, we shall not retard our work, but shall probably "gather inspiration for greater effort, if we occasionally lift "our eyes from our work, and indulge in visions for further "future victories to be won for all that the gas industry, in "its modern phases, stands for in the urban life of the British "people." Too frequently such phrased thoughts are scored over, by those who narrowly think that the routine work of to-day is all-sufficient, as being the utterances of a mere sentimentalist. But the truth remains that there would be no progress were it not for those who so thought, and who take the practical course of adopting the working formulary of to-day in their particular spheres as marking a starting-point for some fresh effort. Mr. Glover's address once more proves him to be one of these; and the gas industry cannot dispense with thinkers and workers of the kind. In fact, it wants more of them.

Take coke. The President puts the inquiry, "Are we "making a product for which there is any adequate and "healthy demand?" There has been the abnormal spectacle lately of a slump in coke while coal has been at very high prices. There is no question that all is not being done that might be done to improve the quality and value of coke. Work is going on to expand demand; but this work must be supplemented at the producing end. Reputation clings and retards in this instance, the same as it once did in respect of gas-fires; and in regard to coke, the same as in the case of gas-fires, something has to be done to eradicate the deeply-rooted beliefs of the past. This eradication, however, cannot take place without improvement in the material to demonstrate that the old belief is a fallacy. The utmost height to which the thought of improvement in some quarters rises is to screen and grade coke for disposal according to its purpose. But what about moisture and ash in the coke? The President urges constancy in these respects. When one considers the quantity of water that is sold as coke, there need be no wonder as to why buyers are not always satisfied with the heating value, despite all that is said about its virtues as a smokeless and excellent heating fuel. Mr. Glover refers to experiments which show that a piece of red-hot coke will absorb 46·81 per cent. of its own weight in water in one-and-a-half minutes; while a piece of cold coke absorbs only 17·64 per cent. in the same time. Was this coke of the texture of that Mr. Glover illustrated as coming from his large horizontal retorts, because, of course, the powers of absorption depend upon the physical characteristics of the coke? However, these figures are both important and suggestive. They point to a need—the need of an inventor who will show how to deal practically with coke from intermittently charged retorts without having to smother its incandescence by the aid of water. The problem has been solved in the case of continuous vertical working; but with any intermittent system of charging and discharging in bulk, the only method—and forsooth it is a clumsy one to which to have recourse—is the expelling of the moisture from the coke by passing the latter through a hot chamber, such as, in 1900, some of us saw at the Clichy works of the Paris Gas Company for providing a supply of dry coke for the French railways, under a specification that defined a maximum moisture content. Then, again, there is little use obtaining coke with a low percentage of moisture in it, unless it is kept dry when stacked; and Mr. Glover provides for this by constructing a light roof over his coke-yard, at an expense that is modest compared with the good effected. The vagaries of our climate, which seem to have been intensified of recent years, urge consideration of this point as to a light roof covering. The ash is a still more difficult question. The President advises a standard percentage of ash in coke, and the careful choice of coal for procuring it. This has the disadvantage of placing a further limitation upon coal purchasing; and the gas industry wants, under present circumstances, to be circumscribed as little as possible in this respect. Coke improvement, however, is imperative. The competition of anthracite and of the coke-oven product is increasing. This competition has to be met; and the gas industry has to recognize Hobson's choice and act accordingly, or else lose ground. It is highly necessary that at the producing end more should be done to help those who are working to stimulate the demand for gas-works coke. From his larger horizontal Ω-section retorts, Mr. Glover is now producing a coke that is of good texture, and so commends itself that the custom of market gardeners which went over to foundry coke has now returned to him.

Like the President of the Institution (Mr. Edward Allen), Mr. Glover thinks that the shutting-down of carburetted water-gas plants during the high price of oil was a mistake, in view of the position of the coke market; and here he runs counter to the President of the Manchester Institution. The defence Mr. Glover makes of his view is of a controversial character; but those who care to cross swords with him will have to encounter the hard facts of his practical experience. His method of operation is to regulate the percentage of carburetted water gas mixed with coal gas according to the quality of the latter, and lessen the enriching oil used with the lowering of the percentage of water gas. In other words, the higher the percentage of carburetted water gas used, the greater the proportion of oil added, and *vice versâ*. In this way, working systematically, something can be done to mitigate the effects of both high oil prices and a sluggish market for coke, and yet keep the gas up to a constant standard. Simple care is all that is required. What is found at Norwich is that, even with a make of 12,000 to

12,500 cubic feet of gas per ton of coal carbonized, the illuminating power, tested by the No. 2 burner, is always higher than the prescribed standard; and the water gas is used as an illuminating power diluent. But the President points out that the flame temperature is higher with the mixture than with coal gas *per se*, and a gross calorific value of about 570 B.Th.U. is maintained. It would be interesting if Mr. Glover would expand upon his experiences in this connection, and give actual data from the neat coal gas, the percentages of water gas added in relation to the quality of the coal gas, and the actual enrichment used with the varying percentages of water gas, together with information as to the specific gravity of the mixed gas under the varying circumstances. He must have at his command a large amount of useful data upon which he has arrived at his findings in this connection.

We come to the question of the use of tar for road purposes—a use that has been great in its advantage to the gas industry. The current conditions in this respect engender complacent feelings; but we are adjured by the President to look ahead. The tar-surfacing of roads is at best but a veneer; and will veneering, which requires annual renewal, satisfy for all time? For a long period on the outlying macadam roads, tar-surfacing will without doubt continue. But greater durability is the thing to be sought for; and what is, and will be increasingly, required of the gas engineer is a bituminous binder, which must have a good resistance to different ranges of temperatures. Mr. Glover has been working for the production of such a binder; and, from examples of road crusts that he had at the meeting on Thursday, it is manifest that he has been highly successful—so much so that he entertains a reasonable expectation that he will in this way dispose of the whole of the Norwich production of pitch. By what he terms the macgrout process, he builds up a good crust, which has a sort of asphalte surface; is from the first resilient; and at summer temperatures does not adhere to the wheels of vehicles, nor to the feet of animals, and at the winter temperatures is not brittle. These are excellent virtues; and the details of their realization will be found in the address. In this way, something has been accomplished which will, it is fully believed, prove of advantage to our urban communities as well as to the gas industry.

The address dealt with many other topics upon which we cannot make any extended comment. There is the question of motor fuels; and Mr. Glover suggests, in this connection, that it would be well to consider whether a low-temperature carbonization process could not be combined with the gas industry's present methods. The low-temperature gas could be stripped, and would be an excellent gas to serve as a diluent to the ordinary coal gas; the free-burning coke would find a ready market; and the heavy part of the tar, after removing the naphtha, would be a pure and tough variety, similar to natural bitumen. It is now a long time since Mr. Glover first gave utterance to somewhat similar views; and we should like to know whether, as the result of his prolonged consideration of the subject, he is prepared to become a pioneer in the industry along the lines he suggests.

Another improvement upon which many eyes are turned is the increasing of the quantity of ammonia recovered in gas manufacture; many, too, are anticipating direct recovery as a practical method for adoption in gas-works. The distance to such a consummation appears to become more and more measurable. Already the President is able to announce that in one works in the Metropolitan area a trial plant is being applied. Meantime, there is the existing method, and the question of its improvement. Mr. Glover describes how he has adopted a fresh arrangement of working his tower scrubbers, which has resulted in an increase in the ammonia recovered and an increase in the working capacity of the scrubbers. But here, again, it would be of interest to have from the President some definite details as to the actual enhancement of results. Mr. Newbigging, in his Manchester address, also spoke as to the investigations that he had made regarding the conservation of ammonia, and the consequent increase in the yield.

The Southern and the Manchester addresses should be read together. They show us how different men under different circumstances are simultaneously on the path of discovery, which will open out into larger economy and efficiency in the industry's technical and commercial operations. Such addresses, full of thought and practice, as this one by Mr. Glover, are not for superficial reading. They are for study; and those who study cannot fail to reap advantage.

District Conferences of the B.C.G.A.

Among the latest developments of the work of the British Commercial Gas Association that we believe will have a far-reaching effect are the district conferences for which arrangements have been made, and which, it is hoped, will be held periodically. Such conferences will have a two-fold value. In the first place, they will be the means of bringing together the representatives of undertakings subscribing to the Association in a given geographical division of the country to discuss the trading side of gas supply; and, in the second place, they will give opportunities for educational work by means of popular lectures and reports in the newspapers for which the local undertakings can arrange in their respective districts. The first experience of one of these district conferences and lectures at Plymouth last Friday is an assurance of their continuance; for, in every way, it was a brilliant success—thanks largely and, in fact, mainly to that long-time progressive administrator in the gas industry, Sir Joseph Bellamy, and his colleagues of the Plymouth and Stonehouse Gas Company, and to the Engineer and Manager (Mr. Percy S. Hoyte), and the Secretary (Mr. H. B. Heath), supplemented by the activity of the Chairman of the local division (Mr. C. Stafford Ellery, of Bath), and the presence of Mr. F. W. Goodenough, the Chairman of the Central Executive Committee, and Mr. W. M. Mason, the Secretary of the Association. The whole event was a worthy inauguration of this new departure. The enthusiasm of the south-western district was clearly demonstrated at the conference. It was marked in the speeches, in the informal address of Mr. Ellery, in the paper by Mr. J. Armstrong, of Ilfracombe, and in the discussion; while the evening popular lecture by Professor Vivian B. Lewes was a triumph both in the representation of the public and in the interest with which the popular lecturer held his audience—an audience comprehending probably from 400 to 500 people—who went away, there is little doubt, convinced as to the sound foundation of Professor Lewes's belief that only the fringe has been touched of the possibilities that exist in the use of gas. Distinct from the publicity side of these district conferences, we are fully persuaded that they will do much to increasingly bring about the feeling of the oneness of the industry which it is so desirable to cultivate and recognize in order to make its defences and progress sure.

Turning from the general to the particular, there are points in Mr. Armstrong's paper which will attract the attention of those who are concerned in the publicity and educational work of gas undertakings. There are in it several things that, in other language, have been said before; but reiteration serves the dual purpose of emphasis, and of providing topic for discussion. Mr. Armstrong has settled and broad views on publicity. He is convinced that the British Commercial Gas Association did not come into existence a day too soon. His conviction is ours. While there is much visible work carried on by the Association, there is also a great deal of highly valuable work done which is not visible except in its effects, and which could only be accomplished by a really representative and competent central organization. The Association has therefore a claim upon every gas undertaking in the United Kingdom; and we hope the resolution passed at the conference appealing to south-western non-subscribing undertakings will meet with good response. From experience in connection with Ilfracombe, Mr. Armstrong subscribes his testimony to the value of national advertising—in magazines and papers which have national, and not purely local, circulation. Speaking of Ilfracombe, in connection with national advertising, reminds us of the extensive reading of popular magazines at seaside resorts during the summer and other holiday seasons; and these are seasons which should be kept in mind when selecting for advertisement purposes magazines and general papers, as well as the periods for inserting articles and advertisement matter in them. There are sentences in the paper suggestive of a little uncertainty on the part of the author as to the value of advertising in local papers. We know that prophets are not supposed to have honour in their own country; but it is the business of a gas undertaking to cultivate honour and credit in their districts of supply. If their advertisements in the local papers have not the same power in producing response from the public as the Association's advertisements in the general newspapers and magazines, it does not necessarily follow that the local advertisements have no value. The local press is not to be bought by the prices paid for advertisements. But it has to exist; and thus the Editor of a local paper naturally feels that those who support

him deserve, so long as his independence is not jeopardized, his support when occasion favours.

Among other topics dealt with in the paper is that of the lady demonstrator, and the qualifications necessary for the commercial staffs of gas undertakings. It must be confessed that, in connection with some undertakings, there is a weakness in this direction; and that assistants, of both sexes, require their technical knowledge of the applications of gas levelled-up to be of the utmost service in these days of competition in every line of a gas company's trading operations with the public. We do not like the idea of "scrapping" any present gas-trading staffs, even where the members are not wholly competent; for they may form the best material on which to work for the promotion of highly efficient staffs. It rests with the managers to see that all their commercial staffs are competent in every respect, and not the transmitters to the public of inaccuracy and (at times) some of the most foolish ideas that have ever had conception in the human mind on the subject of gas application. The excellent publicity work that is being done may be completely undermined by the incompetence and ignorance that have been found in connection with technical points of which the gas show-room attendant and salesman should be complete master. Some day perhaps the Association will round-off their schemes and their usefulness by promoting an oral and written examination for show-room attendants as well as gas salesmen. The "Gas Supply" examination of the City and Guilds of London Institute is hardly what they require, though, of course, if they can pass the examination, so much greater the value of their services. In addition to making known what a gas undertaking has to sell and the conveniences it has to offer those who patronize it, it is found that the cultivation of a local popularity in every possible way is a good business factor. Mr. Armstrong touches on this subject; but we would go even farther than he suggests, and get the undertaking to be publicly recognized as a live supporter of general local interests. It is satisfactory to see that coke "hawking" in Ilfracombe has proved "fairly successful;" it has proved more than this in some other places, but circumstances alter effects. In connection with the development of the sale of tar, Mr. Armstrong questions the advisability of the Association taking this matter under their wing; and in this he coincides with the views expressed in the "JOURNAL" on Feb. 10 (p. 341), and with which views private correspondents have also been in agreement.

There is not anything more that need be said here on the subject of the first district conference, of which a full report appears elsewhere. We may, however, repeat the expression of a confident hope of much good issuing from such conferences, and of the success at Plymouth being repeated in the several divisions of the country. Truly, until the British Commercial Gas Association came in being, the gas industry had never known such organized activity as it knows now.

The Conway Gas-Works Nuisance Case.

THE Conway Corporation have lost their appeal against the injunction granted by Mr. Justice Joyce, at the end of October last, to restrain them from committing a nuisance from their gas-works; and what is more, the Master of the Rolls, Lord Justice Buckley, and Mr. Justice Channell were unanimous in upholding the decision of the Court below. The action, it will be remembered, was brought by Mr. Wood, who became the purchaser of a neighbouring house and ground fifteen years after the gas-works were established on their present site. In making his purchase, he ought to have taken into account (perhaps he did) the fact that there was such a manufacturing process as the carbonization of coal being exercised in the vicinity, and that there should be reasonable consideration given to its character in talking of nuisance. Different people have different notions of what constitutes a nuisance. Mr. Wood regarded himself the victim of a nuisance from the gas-works; there were other people in the neighbourhood who did not find any cause to complain. However, while Mr. Justice Joyce granted an injunction, he did not consider that the injury done was so considerable that he would be justified in awarding anything more than 40s. damages. But if the striking picture as to the terrible condition of the trees is true, as drawn by the Master of the Rolls, then the 40s. damages was surely very inadequate.

After reading the arguments in the Court of Appeal, we fail to find anything which in any way modifies the opinions formed when the case was before Mr. Justice Joyce. We do not think, upon the evidence and the arguments, that from the Conway Gas-Works there is anything more in the way of nuisance than is practically inseparable from an intermittent system of coal carbonization and coke quenching by water. But the Court holds that a nuisance has been proved, and that "whether the defendants could or "could not cure the nuisance is entirely irrelevant. They "are now committing what is a legal wrong, and were "threatening to continue the wrong." Therefore the Corporation have to take steps to prevent the continuance of the wrong; and they are by June 30 to make up their minds what they are going to do, unless they can obtain from the Court an extension of the period. It will not take an expert much time to show the Corporation what will have to be done; but, whatever its nature, it will be expensive. "The remedy," as Mr. Hughes, K.C., mentioned, "will be "out of relation to the wrong." As put in our comments on the case in November last, we cannot altogether absolve the Corporation from blame in connection with what has happened. They took expert advice years ago, and did not follow it. They made promises to the plaintiff some time since to do certain things to abate that of which he complained. They did not keep faith with him. Now a great deal of money has been spent in litigation over the matter; and still the work of abatement has to be carried out. This work would have been less expensive, under the particular circumstances, without the heavy supplementary costs of legal proceedings.

Sheffield and Its Gas Supply.

Some striking figures were quoted in the course of the proceedings at the meeting of the shareholders in the Sheffield United Gaslight Company, with regard to the benefit to consumers of the existing low prices for gas. The adverse conditions prevailing during the past year made it impossible, at these prices, for the Company to earn a sufficient sum to fully cover the usual dividend—and this despite the fact that the sales of gas showed an increase of over 8½ per cent. The possession of a balance which has been accumulated over a long series of years, fortunately, not only secures the dividend, but enables the Company to hold out to the consumers the prospect, in the absence of unforeseen events, of a continuance of the present favourable prices. It will be noted in this connection that the average charge for the whole of the past year's consumption of gas, for all purposes, was 1s. 1·48d. per 1000 cubic feet. What a cheap gas supply represents to them, the citizens will gather from the statement that 1d. per 1000 cubic feet is equal to over £19,000 a year; the total reduction of 10d. in the price made since 1901, having thus resulted in a saving to the consumers last year, reckoned on the consumption, of more than £190,000 on what they would have paid at the 1901 prices. Of course, a calculation on the actual consumption may not, in one sense, be a strictly accurate way of dealing with the matter, as it might be questioned whether the use of gas would have developed to so great an extent at the previous rate of charge—which, however, was by no means an unfavourable one for consumers. But, in any case, the figures do show that the citizens of Sheffield owe the Gas Company a great deal for the enterprising spirit in which the business is conducted. Sheffield is an industrial centre; and in such circumstances the boon of a cheap gas supply can hardly be over-estimated.

Municipal Reform at Leeds.

Those who followed at all closely the events connected with the municipal employees' strike which so greatly disturbed the social and commercial conditions of Leeds at the end of last year, have been expecting to see the complete victory gained by the Corporation over the men followed up by further action. These expectations have now been realized. At the time of the dispute, the control of the city's affairs was vested in a strong Special Committee appointed for the purpose; and this Committee promised in due course to report on their deliberations. To-morrow a special meeting of the Council will be held to consider this report, some reference to portions of which is made in another column. Many matters are dealt with; but with some of them "JOURNAL" readers have no special concern. It is clear the Committee are determined to put an end to the over-staffing of certain departments which was revealed by the strike; and, as a matter of fact, they have put forward suggestions which would

mean a thorough re-organization of practically every department. They say that the strike has shown the necessity for the adoption of improved methods of dealing with wages, conditions of work, hours of labour, &c., of municipal employees; and to enable these to be brought about, the systematic collection of information must be undertaken. Therefore it is recommended that a Commercial Department should be formed, with a Commercial Manager, and a General Purposes Committee as one of the standing Committees of the Council. To this Committee would be delegated the appointment, control, and dismissal of all workmen, and the arrangement of wages, hours of labour, and other matters. So far as the gas undertaking is concerned, the adoption of a complete system of automatic lighting and extinguishing of the street-lamps is foreshadowed; as also is the bringing up to date of the manufacturing plant—much of which, it is admitted, is obsolete. The attempts made by certain men inside the works to frustrate the efforts of the authorities to maintain a gas supply during the strike, form perhaps the worst feature of the report.

A Year's Gas Supply Divided into Seasonal Demands.

In connection with Mr. James Armstrong's paper read last Friday at the district conference of the British Commercial Gas Association at Plymouth, it may be interesting to reproduce the following figures, showing the percentage of his daily sales of gas in Ilfracombe for the different months of last year, and also the average daily send-out of gas at intervals of three hours during the twelve months.

Percentage of Total Sale.

January	8·8	May	6·5	September	10·0
February	7·6	June	6.5	October	9·0
March	7·6	July	8 o	November	8·8
April	6·7	August	10·6	December	9·9

Average Daily Send-Out (Per Cent.) Every Three Hours.

—	12-3.	3-6.	6-9.	9-12.	12-3.	5-6.	6-9.	9-12.
Jan.	2·9	2·8	11·8	9·4	9·7	17·0	30·6	15·8
Feb.	2·9	2·9	11·6	10·1	9·6	14·3	31·5	17·1
March	3·3	3·2	10·7	7·8	11·3	12·0	32·8	18·9
April	3·4	3·3	10·3	8·9	13·2	11·4	28·3	21·2
May	3·4	3·2	10·9	9·2	12·6	13·4	23·0	24·3
June	3·5	2·7	10·0	9·3	14·3	14·4	19·0	26·8
July	3·0	2·8	10·1	9·1	14·2	15·1	16·9	28·8
Aug.	3·2	2·6	10·4	8·5	12·1	13·3	20·2	29·7
Sept.	2·7	3·0	9·8	7·5	11·8	10·9	31·5	22·8
Oct.	3·2	2·9	9·4	7·2	10·9	13·9	33·5	19·0
Nov.	2·9	2·9	10·0	7·6	10·9	18·4	30·4	16·9
Dec.	2·9	2·5	11·2	8·8	10·4	19·4	28·4	16·4
Aver. for 12 mths.	3·1	2·9	10·5	8·6	11·9	14·4	27·1	21·5

Electrolysis of Water Pipes.

Supplementary to the notice of Mr. Carl Hering's paper in the "Electric Railway Journal," from which some extracts were given last week, p. 643, we may reproduce his remarks as to a method frequently used for measuring the resistances of buried pipes in position—called the "indirect." The author gave the following account of a practical test to show the absurdities to which it may lead. The drop of voltage between two fire-plugs connected to a long line of 16-inch cast-iron water-pipe, at two points 100 feet apart, is found to be 500 millivolts, which would seem to be serious. The normal resistivity of such a pipe may be of the order of about 0·01 milliohm per foot; so that the resistance of 100 feet should be about 1 milliohm. Hence the calculated current which is flowing would be 500 amperes—a quantity quite important, and possibly quite serious. To find out whether this is true and to confirm it, the "indirect" method is applied. The ammeter is connected and reads 250 amperes, and the reduced voltage is found to be 250 millivolts, or just one-half of the former. The current calculated from these observations will then be 500 amperes—confirming the first estimated value so nicely that it would generally be accepted as a proof. Two entirely different methods had given the same results; and the tester is satisfied, and the pipe owner is worried. As a matter of fact, and in spite of these readings and tests, a perfectly insulating joint existed in this 100 feet of pipe under test, and normally absolutely no current was flowing through the pipe under these conditions; showing how seriously wrong the results of these measurements may be. Since the method gives the same results whether or not the current is flowing, it is totally unreliable in this form.

The nineteenth annual dinner of the Association of Engineers-in-Charge will take place in the King's Hall at the Holborn Restaurant next Saturday. Mr. R. T. Glazebrook, C.B., M.A., D.Sc., F.R.S. (the President of the Association) will occupy the chair; and Sir Alfred Keogh, K.C.B., LL.D., F.R.C.S. (Rector of the Imperial College of Science and Technology), will be among those present.

OBITUARY.

EDWARD JONES, OF BURSLEM.

We regret to record the death, on the 7th inst., of Mr. Edward Jones, the Gas Engineer and Manager to the Burslem Corporation. It may be remembered that in September last Mr. Jones sustained severe injuries to his head while alighting from a tram-car at Longport; and he was in consequence unable to attend to his duties. A few weeks ago he had recovered sufficiently to allow him to visit friends in Liverpool, in the hope that the change would be beneficial. He, however, had a relapse a week after his arrival, and to this he succumbed.

Mr. Jones was educated at Liverpool College, and served his articles as an engineer with Mr. W. Bruce, of that city, who designed and constructed works for the Gas Company. He afterwards entered the Company's service under Mr. William King, and was placed in charge of the machinery and apparatus department. From Liverpool he went to Sligo, as Assistant-Manager of the Gas Company, and subsequently obtained the position of Gas Manager to the Ellesmere Local Board. After five years' service, he went to New Mills as Engineer and Manager of the gas-works, and while there was entrusted, in conjunction with Mr. Henry Bancroft, of Manchester, with the preparation of a scheme of water supply. In 1900 he moved from New Mills to Pontypridd, to become Gas Engineer and Manager to the Urban District Council—a position he held till December, 1905, when he obtained the appointment of Gas Engineer and Secretary to the Burslem Corporation, in succession to Mr. Henry Peaty. He was regarded by the Gas Committee as a very capable official; and they sympathized greatly with him during his illness. His death causes the first vacancy in the managerships of the various gas-works since the federation of the county borough.

Mr. Jones joined the Gas Institute in 1902, and passed into the Institution. He was one of the founders of the Wales and Monmouthshire Institution of Gas Engineers, and was President in 1907. In 1905 he read a paper describing the new stoking machinery at the Treforest works. He was also a member of the Midland Association, and of the Institution of Mechanical Engineers. He was a prominent Freemason, and at the time of his death was J.W. of the Sutherland Lodge, and but for his accident he would have been raised to the chair at the last installation. He was well known in Burslem for his support of charitable objects.

The funeral took place at Welshampton, Salop, last Wednesday, and was attended by Messrs. W. Langford, W. Prince, R. Surtees, and F. L. Wimhurst, colleagues of the deceased, and Mr. F. Ashley, of Ellesmere; also by the Chairman (Alderman Mitchell) and Vice-Chairman (Alderman J. Shenton) of the Gas Committee of the Burslem Corporation.

Mr. Jones was in his fifty-fourth year. He leaves a widow, three sons, and two daughters. His eldest son (Mr. S. Jones) is Assistant-Manager of the Burslem Gas-Works, and his youngest son fills a position in the offices.

The death has occurred of Mr. H. L. Mallet, who was for many years Chairman of the Great Torrington Gas Company—a position which he recently resigned on account of ill-health. The deceased, who was eighty years old, was Mayor of Torrington for four years.

At the recent annual meeting of the Bristol Water Company, the Chairman announced the death—since the signing of the report noticed in our issue of the 3rd inst., p. 596—of Colonel Evan Llewellyn, one of the Directors and also on the Board of several other Companies, such as the Great Western Railway, the Alexandra Dock, &c.

A well-known resident of Dover, and for many years a Director of the Dover Gas Company, in the person of Mr. W. W. Burkett, died on the 5th inst. He had been a member of the Corporation since 1891 and was Mayor in 1905. At the half-yearly meeting of the shareholders in the Gas Company on the Monday before Mr. Burkett's death, the Chairman made reference to the absence through ill-health of his colleague, and wished him a speedy recovery.

PERSONAL.

The Liverpool Water Committee have decided to recommend that Mr. Jonathan R. Davidson, M.Sc., Assoc.M.Inst.C.E., at present principal Assistant-Engineer for the Rivington and Vyrnwy works, who has been in the service of the Corporation since 1898, be appointed, from June 1, Water Engineer, at a salary of £800 per annum, in succession to Mr. Joseph Parry, who is to act in the capacity of Consultant Water Engineer.

Mr. J. B. Hyde, who for a considerable period has held a responsible position in connection with the Eastcroft Gas-Works of the Nottingham Corporation, was last Wednesday the recipient of a substantial token of regard, upon leaving to take up his new appointment at the Hastings and St. Leonards Gas-Works, under Mr. C. F. Botley, the Engineer and Manager there. The presentation was made by Mr. W. Gregson, the Superintendent

at Eastcroft, on behalf of the workmen and staff, and consisted of a solid gold albert and pendant, suitably inscribed.

We learn that Mr. FRANK BOARDMAN, the Superintendent at the Bromley works of the South Suburban Gas Company, under the Engineer (Mr. S. Y. Shoubridge), has obtained the appointment of Assistant-Engineer of the Cardiff Gas Company, for which applications were invited in the "JOURNAL" for the 17th ult. Mr. Boardman received a technical education, and was afterwards apprenticed for three years at Messrs. Smith and Coventry's large engineering works at Salford, where he passed through the shops. He was subsequently articled for a similar period to Mr. W. W. Woodward, the Gas Engineer and Manager to the Salford Corporation, and went through all the departments—works, laboratory, drawing office, and outdoor department, &c. On the completion of his articles, he filled the position of General Assistant on the works for twelve months. He then obtained the appointment of Assistant to Mr. William Woodward, the Engineer and Manager of the Bromley and Crays Gas Company. When the Company was absorbed by the South Suburban Gas Company two years ago, Mr. Boardman was appointed Works Superintendent. He has been at Bromley for nearly seven years. There were 40 applications for the position at Cardiff.

The Council of the Institution of Gas Engineers are honouring an old member of the gas profession, who has risen to an eminent and responsible position in our national life. Mr. H. P. MAYBURY, M.Inst.C.E., was at one time in charge of the engineering work, among which were the gas and water supplies, of the Malvern District Council; and, by his personal ability, he secured the position of County Surveyor to Kent. In this office, he soon rose to be recognized as the leading authority on road construction and maintenance under modern conditions of use; and to him perhaps more than to any other man is due the vast favour into which tar rose as the mitigator of a public nuisance, and as a valuable aid to the reduction of the expense of road maintenance. He is now the Chief Engineer of the Roads Board, in which position his functions are widely cast. Although he has only been in the office for two or three months, his work has taken him to many parts of England, Scotland, Ireland, and Wales. His energy seems to know no bounds. The Council of the Institution have, we understand, resolved to nominate Mr. Maybury, and he has consented to have his name put forward, as an Honorary Member of the Institution. Mr. Maybury was present at the meeting and dinner of the Southern District Gas Association last Thursday, and was heartily welcomed by his old friends.

Bye-Product Producer and Power-Gas Plants in Germany.

It will doubtless interest readers to be informed that German industries have lately wakened up to the importance of these highly profitable plants. This is largely due to the activity of Mr. Arthur H. Lymn, of Sanctuary House, Westminster, S.W., who some time ago introduced a new system of plant. A large plant on this principle has been in operation with highly successful results for three years at the works of the Zellstoff-fabrik Waldhof, Mannhein (a Company having a capital of from £3,000,000 to £4,000,000); and another plant on Mr. Lymn's system has been built by his German licensees, Messrs. Ehrhardt and Sehmer, for the Badische Anilin-und Soda Fabrik of Ludwigshafen-Rhein—probably the largest chemical-works in the world. It is interesting for us to be able to add that Mr. Lymn's new and improved system has now been adopted by the German Government for their central power station at Heinitz. This plant is at first being constructed for 3000 K.W.; but it is intended to double it later on. It will supply gas to large engines built by Messrs. Ehrhardt and Sehmer.

The "Electrician" Electrical Trades Directory.

We have received from the "Electrician" Printing and Publishing Company, Limited, Salisbury Court, E.C., a copy of the thirty-second annual edition of the above-named Directory, which is familiarly known as the "Big Blue Book." It was published at the end of February, and its contents (occupying upwards of 2200 pages) are corrected up to the latest possible moment. The law of electric lighting, &c., is fully dealt with; and a digest, specially prepared by Mr. A. C. Curtis-Hayward, B.A., A.I.E.E., solicitor, is given. The principal legal decisions in 1913 affecting the electrical industry are included. Full financial details in regard to electric joint-stock enterprise, and ample information relating to the financial side of every branch of the electrical industry, will be found, including a directory of directors of electrical companies, particulars of the capital authorized and issued, the last dividends paid, latest Stock Exchange quotations, lists of chief officials, &c., also the electrical and allied companies wound-up during 1913. The directory division contains the names and addresses of practically all persons engaged in the electrical profession and industry throughout the United Kingdom, with their telephone numbers and telegraphic addresses; and a separate list of the telegraphic addresses (alphabetically arranged) is likewise included. In the Biographical Division will be found interesting original sketches of the careers of the leaders of electrical engineering enterprise at home and abroad. A graphic survey of the engineering and electrical equipment of all the electricity supply, electric power and electric traction undertakings of the kingdom is also given.

NOTES FROM WESTMINSTER.

THERE were not many Committees sitting last week; but there have been some interesting happenings in connection with some of the Gas Bills.

New Faces at the Bar. There are new faces at the Parliamentary Bar. Mr. Jacques Abady was seen in the corridor towards the end of last week, waiting for the Leyland Gas and Electricity Bill to come on before Mr. Mount's Committee. We hope to see shortly in the Committee-rooms Mr. W. C. Nixon, son of Mr. W. Nixon, the Secretary and Manager of the Southbank and Normanby Gaslight and Coke Company. On the Brentford Bill, among Counsel have been Mr. Moon, son of Mr. Ernest Moon, K.C., Counsel to the Speaker of the House of Commons, who, before his appointment to his present high official position, frequently appeared as Counsel on gas and water measures.

Calorific Power. As mentioned last week in the editorial columns, the Brentford Gas Company have agreed with the London County Council and other local authorities to abide by any decision arrived at in connection with testing, after what Mr. Honoratus Lloyd, K.C., calls the "full-dress" debate that is to take place on the Gas Light and Coke Company's Bill. There are other promoters, it is understood, who have also followed the Brentford Company's example, and agreed to defer their calorific clauses, so that they may be modelled on the lines of any decision arrived at in connection with the Gas Light or other big Bill; and the only other Bill deserving the description of "big" which deals with the matter is the Liverpool. There must be a care over these agreements; for no one wants a dual standard, nor is it right that the numerical terms agreed to in (say) the case of the Gas Light Bill should be applied universally. It should be made perfectly clear that any agreement on any Bill to postpone consideration of the matter should not mean that the promoters consent to the application *literatim* to themselves of the terms arrived at in connection with the Gas Light or any other Bill. The Gas Light Bill has been committed; but up to the end of last week, it had not been allocated to a Committee. It is understood that the Board of Trade are considering the measure, and will be reporting upon it. Some time ago it was stated in these columns that the Spring Gardens authorities had an inclination towards co-ordinating the testing arrangements in London when any further change was made; and this inclination continues. Their agreement with the Brentford Company is an indication of this; but whether it is intended to try to force matters in any way, with the South Metropolitan and Commercial Companies not in Parliament, and not making a move in the matter, cannot be said. But whatever is done this session is bound to become general in London before long. The County Council have not been testing the calorific value of the gas of the southern and eastern companies "for information only," but they have been doing it with some end in view.

A Heavy Spill. The session has opened badly—for the Brentford Company; for one of the three things that formed the main part of their parliamentary scheme this session has been wrecked, though, of course, it does not affect the present position of the concern by a single jot. It affects it prospectively in doing better than before. The Chiswick site has been refused by Lord Hylton's Committee; but it was very shallow evidence on which this was done. The expert witnesses for the Bill—Sir Corbet Woodall, Mr. H. E. Jones, Mr. E. H. Stevenson, Mr. A. A. Johnston, and Mr. D. Watney—were all in favour of the site. On the other side, there was only one expert witness—Mr. Arthur Valon—and while he sought to show that a farthing and a penny were really very insignificant coins of the realm, his figures also proved that, when the Chiswick site was developed, the farthings and pence would represent progressively thousands of pounds. When the figures are examined, and remembering that the economies are not merely diurnal but permanent, it seems that it would have almost paid the consumers in the extended area of the Company to have subscribed to buy up the property owners in the vicinity of the proposed site who are not favourable to gas-works as neighbours. Why, in the Brentford area alone, 1d. reduction in price represents £14,200 a year; and the Company are annexing under the Bill the Staines and Egham and Sunbury Companies' areas and other territory, so that 1d. will soon represent a great deal more than that. Mr. Balfour Browne, K.C., forgot for the nonce all about the sliding-scale, and what takes place in connection with the distribution of tangible savings; for he said that the Company's Bill was a shareholders' one and not a consumers' one. Even Mr. Balfour Browne has side-slips occasionally; but ere long we shall have him back talking fluently of the great advantage to communities of the utmost economy and efficiency in the working of gas undertakings. The processes of degeneration and regeneration are rapid ones at the Parliamentary Bar. But about the local opposition to the site at Chiswick. One of the remarkable things of the case was how quickly the laity in gas matters, as represented by a few residents in the locality, developed the profoundest knowledge of gas-works operations, and told of steam, fumes, and other unpleasantness arising from the work, and of how there was nothing to prevent these things. Continuously

working vertical retorts were unknown to them, as well as the little smell that now arises at rare intervals from oxide purification. They were not aware of the close approach of new gas purification systems which will render even a little smell at wide intervals quite unknown. Sir Corbet Woodall regards a gas-works as something that can be made fairly æsthetic; and if Mr. H. E. Jones finds nuisance or smell existing, he wants to know why waste is going on. There was the traffic to and from the works; the very object of minimizing this and saving money caused the favouring of the Chiswick site by the river, seeing that traffic leaves no permanent marks on the surface of the river, and causes no unpleasant rumbling noise. When nuisance is spoken of, the Brentford Company can boast of Kew Gardens being only 300 yards or so from their Brentford station; and many gas-works can show a healthy horticultural surrounding, or a healthy and dense population. We cannot help agreeing that it would be the greatest blunder if the Company were forced to continue for ever and ever at Southall. At any rate, for the time being, Chiswick does not want its rateable value improved by the presence of large gas-works.

Other Points.

In all else the Bill has been successful. There was a little point made regarding the financial provisions of the Bill; but Mr. William Cash showed that there was wisdom in the consolidation scheme, and some other matters with which finance is associated. The amalgamation scheme with the Staines and Sunbury Companies was confirmed by the Committee. The power to bargain for Provisional Orders for electricity supply, and to apply for powers to do business in electrical energy in areas not in the occupation of existing electricity vendors were allowed, on the understanding that the Company are not to ask for authority to distribute current in the areas of present suppliers. Electricity people were up against the Company, but unsuccessfully, in this matter. In examination they seem to be a little shy of having to deal with the economical position in which established gas undertakings are for providing the community with electrical energy—a totally different position from electricity undertakings, which would not find it such an easy matter to tack on to their electricity supply business a gas undertaking. The authorization to supply power gas is to be confined to a radius of half-a-mile of the gas-works. There is no difficulty about this. The local authorities strove hard to gain an unfair advantage from the old public lighting clause—holding that they had the right to a supply for public lighting even at the lowest price charged for gas used for power. But the Committee considered that, as lighting was the business of a gas company when the public lighting clause giving the right to a supply at the lowest price charged was originally introduced into many Gas Acts, the emphasizing of this condition now by the insertion in the clause of the words "for lighting" would be just. There were many other things the local authorities wanted; but fortunately for the Company and the commonsense of Parliament, they did not get them.

Preference for Gas in a Mining District.

The mining district of Ashington, it is hoped, will be shortly brought from outer darkness into the full light and utility provided by proper gas supply, Ashington seems to have been under the dominion of the Ashington Colliery Company, who have a small gas-works, about the development of which they do not appear to have lately concerned themselves very much; and the Northern Counties Electric Supply Company, and latterly their successors (the Newcastle Electric Supply Company), have had the run of the place under specially privileged circumstances—the Colliery Company whose coal is a steam variety, which may partly account for the neglect of the gas business—acting as collectors of the charges for electricity from the miners by deducting the sum from their wages. There have been complaints as to the electricity supply. The District Council (the promoters of the Bill which is to give the district the relief of a gas supply) have complained; and they have tried to get better street lighting and an extension of it on more favourable terms. The Electricity Company have been, so to speak, the cocks o' the walk; but they now make no secret of the fact that the promotion of a Gas Bill by the Council has stirred them out of their complacency and feeling of monopolistic independence. They came down with a run—offered the public lighting on reduced terms, and many concessions to the private consumers. Anything to prevent a proper gas supply coming into competition with them. The fear of gas competition was and is upon them. They do not like the aspect of things. Mr. Arthur Valon, by the way, is concerned as technical adviser in this matter to the District Council; and the case that was presented in favour of the Bill before Mr. Mount's Committee last week shows how thoroughly he has gone into the whole question—so thoroughly that Mr. E. H. Stevenson and Mr. Frank Jones were able to give the scheme an unqualified support. The canvass made of the district reveals a very curious state of affairs, and incidentally the cause why the Electricity Company are anxious the Gas Bill should be killed, and a systematized competition with them averted. There are in the area 2992 houses wired for electric lighting—the houses being mostly occupied by colliers. But not all the tenants of these houses use the current; and no less than 2173 now aver that they prefer gas, which they can use both for lighting and cooking, and pay for as they go. There are also 2261 houses lighted by oil; so that there is a big field here for gas. We do not blame the District Council for not being converted by the overtures of the Electric Supply Company. Of course, the Colliery Company, under the circumstances of their position with the Electricity Company, could hardly do anything else than magnificently support the latter, by trying to overthrow the Gas Bill, and collaterally looking after a proper *solatium* for their removal from the gas business. Mr. Henry Woodall appeared for the Colliery Company; but there is not a Woodall of whom we know who can say that it is not a proper thing for every populated area to have a good supply of gas. Mr. Mount and his colleagues thought this; and the Bill went through with flying colours. There is to be compensation to the Colliery Company for any loss sustained by reason of their ceasing to supply with gas private houses in the district, and the Council are to purchase the Company's pipes in the streets. The figures are to be settled by arbitration, failing agreement. But, as the Company did not appear on clauses, they may be pondering over the question of going to the House of Lords.

ELECTRICITY SUPPLY MEMORANDA.

THE whole of the suppliers of electricity in London, as well as the local authorities, appear to be in a state of ebullition over the Electric Supply Bill promoted by the County of London Electric Supply Company. Reference has been made to the subject before in the "Memoranda;" but it will be of interest to report progress. The Bill, as we expected it would do, has raised a storm of protest and resentment; and more especially since it has transpired that a couple of banking firms are at the back of the proposal, and (so it is reported) are proposing to float a "holding company" and exchange the shares and debentures of the new concern for stock held by shareholders in the existing electric supply undertakings, in order to get a controlling interest in the latter. The Bill, it will be remembered, proposes to give the existing companies an increased tenure beyond 1931, in which year, under existing legislation, the London County Council will have the right of purchase. It also suggests creating a large generating station at Barking, for the purpose of supplying to the distributing companies electricity in bulk. Most of the important electricity companies, the London County Council, the Corporation of the City, and the Borough Councils have petitioned against the Bill, so that we may expect (if the promoters are not alarmed by the avalanche of hostility) another big and expensive tussle in Parliament just as occurred a few years ago over the question of the London electricity supply. The County Council very naturally are opposed to the Companies having any extended powers such as are proposed, to any prolongation of life, to the sacrifice of capital, and to the piling up of additional capital such as is contemplated. A report has been, or is being, prepared by Mr. Merz for the County Council, dealing with the whole situation. Among the mass of conjecture to which circulation has been given is that, as one result of the report, something may be proposed whereby the Council may suggest a plan of rendering assistance to the Companies, if required. The Borough Councils (a Committee of the supplying ones are surveying the question as to what advantages, if any, would be derived from a bulk supply scheme for themselves) also view with alarm, or they say they do, any parliamentary powers being granted which would increase the value of the companies' undertakings. Most of the more conspicuously successful companies regard the Bill as a reflection upon their administration and policy, and point to their financial success, and the average price at which electric current is supplied by them. To several of the companies, the scheme of the County of London Company, and that of the financiers who are proposing the "holding company" are not found to be at all acceptable.

Chaos in London.

A Trenchant Financial Criticism.

The most damaging criticism that we have seen has fallen from the lips of Sir Alexander Kennedy. This was made at a meeting of the Westminster Electric Supply Corporation. From it, it appears that the present capital of the companies is about £15,000,000. The proposed further capital is £4,000,000 or £5,000,000 (but Sir Alexander thinks it ought to have been a great deal more) for the erection of a new station; and £4,000,000 for other purposes. This is an addition of £8,000,000 of capital, or practically 50 per cent. more than the existing capital of the companies. Then Sir Alexander points out that the costs of an electric supply undertaking are divided practically into three parts. About 25 per cent. of the whole is the cost of generation; about 25 per cent. the cost of distribution, management, rates and taxes, insurance, and so on; and the remaining 50 per cent. is capital charges—50 per cent. of the whole of the costs! Therefore, an increase of 50 per cent. in the capital, especially when some £4,000,000 worth of plant is to be scrapped, means an enormous addition to the expenses—an addition which cannot possibly be balanced by savings in generation; the total costs of generation being only about half the total capital charges of the companies. The County of London Company have taken on themselves a big task; and it will be a remarkable thing if

they succeed in convincing Parliament that their way is the one to an improvement upon the existing electrical state of things in London—in view of the fact that this state is existing.

Private Generating Plants.

The distribution of expenses as mentioned by Sir Alexander Kennedy is very interesting. A considerable amount of wind blows from electrical quarters in justification of low charges for current resting exclusively upon the costs of generation. If, in the gas industry, we argued in the same way, then there are some of those managers who can put gas into the holder, under certain systems of carbonization, at about 4d. per 1000 cubic feet, who might supply for certain purposes at 5d. per 1000 cubic feet—adopting in extenuation the same line of argument as electricians. But Sir Alexander says that 25 per cent. of the expenses of an electrical station are due to distribution, and 50 per cent. to capital charges. These figures show why the private gas-driven generating plant for the lighting and power requirements of large business and other establishments cannot, with profit, be beaten by the supply from the local electricity cables. There are with the private generating plant no heavy distribution expenses, and the capital charges are not anything like 50 per cent. of the total costs. There is another circumstance that makes it still more difficult for the purveyor of current from a central station to compete with the private generating plant for the supply of current at a low uniform price for lighting and power, and that is the advent of the so-called "half-watt" lamp, which, with proper eye-protecting globes, can be used for the lighting of large show-rooms, and save current compared with the older 1·3 watts per candle metallic filament lamp. This reduction of consumption for lighting makes it harder for the central station manager to supply at a competing profit-bearing price, seeing that the load is so much reduced. There is also the difficulty as to the charge for supplies being the same under like circumstances—a statutory provision that is sometimes conveniently overlooked by electricity suppliers when trying to compete with private generating plants and high-pressure gas lighting.

In Opulent Marylebone.

Marylebone is one of the choicest districts in London for an electricity-supply department, controlling as it does such a large portion of the big shopping areas of the west-end and a residential population the major part of which does not have to consider the expenditure of every penny. For some years the department has been at work on the development of the cooking load; and—through the energy that Mr. Seabrook and his faithful henchman (Mr. H. H. Holmes) have thrown into their work—there are, we read, some 250 complete cooking-ranges in use in the district, and nearly 500 smaller cooking appliances. These figures appear in an article in the "Electrical Times;" but the writer does not seem to know, or at any rate he does not state, how many of the people using these appliances have other means by which their daily food can be prepared, and boiling operations (including the provision of domestic hot water) be performed. It seems that the form of cooker favoured in Marylebone is not the "Tricity"—but the "Jackson;" and one of the advantages of it is that, the equipments being standardized, speedy renewal is simplified when breakdown occurs. Gas-cookers do not suffer from such breakdowns. Opulent as the residents of Marylebone are supposed to be, they prefer to hire the electric-cookers from the Electricity Department at a quarterly rental. We once read in a paper by Mr. Holmes the rental charged, or perhaps it was the rental he thought ought to be charged (we forget which now), but it remained in memory as one that would make the majority of London householders "sit up"—and that before anything is paid-out for electrical energy. It is stated that the department prefers supplying cookers on hire. Our readers will please politely turn their heads when they smile. The reason for this benevolent attitude is that the department can then retain the "maintenance in its own hands, and keep a watchful eye on the apparatus." This watchful eye is very necessary. Every few days an expert used (we suppose the same procedure still obtains) to visit the cooking apparatus to see that things were in order, and to ensure as far as possible that nothing was likely to immediately "go," and spoil a dinner and the reputation (such as it is) of electric cooking. In maintaining its character for stupid animosity and misrepresentation where gas is concerned, the "Electrical Times" writer says that, with electricity the glazed tiles of the walls "do not become soiled as they would if gas fumes or coal smoke were present." "Gas fumes" are not interpreted; but why there should be anything given off from a cooker burner, in the way of soiling fumes we do not know. The same writer heard complaints in "one or two instances;" the cooks stating that, owing to the small amount of extraneous heat thrown out by the electric-cookers the kitchens were very cold during the winter. It is suggested by the writer of the article that an elecric-radiator would get over the difficulty. Heavens! Fancy electric radiators for kitchens from 6.30 a.m. to 11 p.m. in the winter!! The boiling discs are another cause of complaint; cooks bemoaning their lethargic behaviour. It is also intimated that the adoption of the electric-cooker has done away with the necessity for the use of Keatings in kitchens; for beetles and cockroaches are practically unknown now. The discovery of recommendations for electric-cookers grows.

Costs.

Some costs are given in the article, but they illustrate the absurdity of such figures without reference to the work done. They illustrate, too, the variety of the tastes and depths of pocket of different persons; and they do not confirm the electrical view that it necessarily follows that the more people there are to electrically cook for, the lower the average cost per person. All conditions must be equal; and they are not in these households, or in any with which we are acquainted. There are twenty-three instances of costs given—the columns in the table supplying figures as to the number of persons cooked for, the average daily cost per person, and the average consumption per month. We will only give the highest and the lowest figures to illustrate the fatuity of quoting information such as this. The figures are for households represented as having no other means of cooking than the electrical. What does "cooking" mean? Does it include all boiling operations and the provision of hot water for the household—work frequently done on the gas-cooker? The highest average daily cost per person for electric cooking is for a family of four; it is 2·5d., or for the four 10d. per day! This is, we understand, at the low charge of ½d. per unit. The average consumption per month is 595 units, or 148·7 units per person. The next highest cost is for fourteen persons. The cost works out to an average of 1·76d. per person per day; the average consumption of units being 1480 per month, or 105·7 per person. We go to the other end of the stick and find a case of five persons, whose cooking costs work out per day to 0·42d. per person—the average monthly consumption being 123 units, or 24·6 units per person. There is also a case of ten persons whose average daily cost is the same—0·42d., with an average monthly consumption of 251 units, or 25 units per person. Verily the difference between 0·42d. and 2·5d. per person per day is great, and, as we say, shows divergent tastes or pockets. Would it not be better to include in figures of this kind the whole of the expenses other than for current—rental and maintenance, and work that has to be done by other means on the abandonment of the gas-cooker, so as to get really comparable results?

An Appeal to Working Men.

The Aylesbury and District Chamber of Commerce ought really to have been better capable of seeing the true commercial bearing of the electric supply scheme that is being proposed by the District Council than to have made themselves responsible for a circular that they have addressed to the working men of Aylesbury. The whole point of the circular, so far as it concerns the working man, is answered by this: That if there is any danger of an electric supply undertaking in a town like Aylesbury not proving remunerative, and of the losses coming upon the rates (as has been the wretched experience in so many other towns, even of larger populations than Aylesbury), then let those who desire to have electricity form a company to supply it, and themselves bear any losses that may result from the business. Why the whole of the ratepayers of any town should be made to bear annual losses—even of a few hundred pounds—incurred on behalf of a small number of the ratepayers has never received any rational explanation. It is decidedly to the interest of the working men of Aylesbury to make this answer to the Chamber of Commerce; for an electric supply company would promote competition as well as a concern run by the District Council, and no losses incurred by a company would come upon the rates. The members of the Chamber of Commerce who issued the circular might themselves invest the necessary money to start a company; for apparently they are more interested in the question of electricity supply than the working man, who cannot afford to patronize electricity for lighting, and certainly not for cooking, and would sooner have a single transaction for both purposes through one meter. From a Chamber of Commerce—an organization of business men—we are surprised at the senselessness of the circular. Take this statement as an example: "The fact is that £1000 has been added to the original cost, as planned for lighting only, in order to provide cables for power purposes, which will yield an immediate income of £350 to £400 a year to begin with from factories only. This will be the result of employing the plant in the day time when it would otherwise be idle." Now what real financial advantage will that be? Is Aylesbury ever likely for manufacturing purposes to secure a load exceeding to any material extent the £350 or £400 mentioned? Take, however, the facts as stated, and not problematical conditions. It is acknowledged that there will be an expenditure of £1000 on cables for power purposes. The ordinary repayment period allowed for cables is twenty years; so that, with interest, the capital charges on the £1000 would be about £100 a year. Fuel is required for generating the units supplied for power; the use of the generating plant requires oil, water, attendance, and involves other charges; the generation of current at any time means depreciation of generating plant; and all this is to be paid out of the balance of £250 or £300 a year, and a profit secured! What price per unit is going to be obtained for the power supply? Yet this Chamber of Commerce—this organized body of business men—write: "So electric current will become proportionately cheaper for all users." These are not the days of miracles; but they are manifestly days when some men cannot, in certain matters, see beyond their noses. The working men of Aylesbury will do well to say: "Let those who want electricity provide the means for supplying it."

ILLUMINATION AND ARTIFICIAL LIGHTING.*

In this little book (with its 238 pages and 126 illustrations), which is intended mainly for students, Mr. Blok has aimed at supplying a concise summary of the principles underlying artificial illumination. The latter part also contains a brief account of the characteristics of the chief illuminants—gas, electricity, petrol air gas, acetylene, &c.; but this is only regarded as supplementary.

The early chapters cover familiar ground. The opening pages are devoted to the "nature of light." Something is said on the behaviour of the eye at high and low illuminations and the physical laws underlying the radiation of light from incandescent bodies. There is also a short reference to colour problems, and the instruments used for studying the spectrum of illuminants. The Ives calorimeter is also described; but the author does not attempt to discuss in detail the various types of spectro-photometers, the tintometer, and other apparatus of this kind.

The second chapter is devoted to units and standards. The author explains concisely the chief photometric quantities, and lays special stress on the conception of flux of light—in this respect differing somewhat from some authorities in this country, who prefer to work in terms of candle power and foot-candles. In the succeeding chapter there is a discussion of the chief illumination photometers. The author, within the limited space at disposal, does not attempt to deal with photometers in general.

We next come to what many would consider the most valuable chapter in the whole book—that on illumination calculations. Mr. Blok passes from the simple calculations of horizontal and vertical illumination to the prediction of illumination curves, and the determination of the combined illumination due to a number of sources. An excellent feature is the series of worked numerical examples, by means of which each step in the reasoning is illustrated. The author follows the usual procedure in describing methods of determining the mean spherical candle power from the polar curves. On p. 72 he brings out clearly the distinction between the polar curve and the flux diagram—a matter which is apt to prove confusing to students, who do not realize that the horizontal ray in the diagram illuminates a far greater zone than the vertical ray would do, and must therefore be given more prominence in calculating the mean spherical candle power.

Mr. Blok describes various forms of apparatus for experimentally determining polar curves and mean spherical candle power. His treatment is necessarily condensed; but some of the most up-to-date methods are shown, and the diagrams are mostly self-explanatory.

A good chapter is that dealing with reflectors, globes, and shades. The author assembles on one page a series of polar curves showing the large variation that is met with in the case of modern illuminants. From these he draws conclusions as to the vital importance of good methods of shading. Polar curves of a number of typical shades are reproduced. Mr. Blok follows the good plan of placing beside each diagram an illustration of the type of unit tested; and we are glad to see that he also makes a practice of giving on the diagram not only the polar curve of the shade itself, but also the corresponding curve from the illuminant used with it.

A point of some interest to gas engineers is that the mere placing of a globe or shade over a mantle may alter the temperature, the air-currents, and the conditions of combustion generally. As a result, the state of the mantle is changed, and the amount of light is affected. Naturally, this may interfere with accuracy in the determination of the reflecting power. In fact, a source may actually yield more light when enclosed in a globe.

In the two chapters on indoor and outdoor illumination we find other examples of illumination calculations, and some necessarily brief but clear general recommendations on the placing of lights. Here again the diagrams are of considerable assistance.

The book concludes with an appendix containing various tables and illuminating engineering data. Mr. Blok's book is certainly one that students will find of service; and it should be a fitting introduction to more complete treatises on specific sections of illuminating engineering.

* "The Elementary Principles of Illumination and Artificial Lighting." By A. Blok, B.Sc. London: Scott, Greenwood, and Co.; 1914.

Cleaning Small Water-Pipes.—A device for cleaning small water service-pipes was described recently at a meeting of the New England Water-Works Association. According to "Engineering News," the author stated that the device was of benefit in cleaning out small pipes without the use of rods. A proving or testing pump is put into the pipe, usually in the cellar. This pump is capable of giving a high pressure, though in practice 200 lbs. is rarely exceeded. In front of the pump is introduced a wad of any paper easily dissolved in water. This permits the pressure to accumulate. As the force-pump—which is usually fed from an ordinary hand-pump drawing from a pail of water—starts operations, the plug of paper is slowly forced through the service-pipe out into the main, thoroughly cleaning the pipe. It is stated that cases where the bore of the pipe decreases as it approaches the main, and also where the cock at the main is all but closed from dirt and corrosion, have yielded to this method.

CYANAMIDE AS A FERTILIZER.

Prospective Competition of Sulphate of Ammonia.

The problem of artificially fixing atmospheric nitrogen, and combining it in suitable form for plant food, has been one which has had the attention of scientists for many years; and among the results of their labours was the discovery, in 1895, by Drs. Frank and Caro, that when nitrogen is conducted through a hot mass of calcium carbide there is produced calcium cyanamide, which is very rich in nitrogen. The matter has already been referred to in the "Journal." The recognition of the value of the compound as a fertilizer led to the establishment of numerous factories for its production—notably in Sweden and Norway. Two years ago, the shareholders of the Alby United Carbide Factories, Limited, sanctioned an increase in the capital from £400,000 to £550,000, in order to provide funds for the extension of the Odda carbide plant to a capacity of 80,000 tons per annum. One of the biggest cyanamide factories is situated at the Niagara Falls, where the large quantities of electricity required in this industry can be obtained at low cost. It is the property of the American Cyanamide Company, who commenced operations on Jan. 1, 1910. The original plant had an output of 12,000 tons per annum; but this was increased during 1912 to approximately 32,000 tons, and further extensions are in progress to give an annual output of 64,000 tons. From the very commencement, it was felt that the original plant would be unequal to meeting the requirements of the market; but the Directors of the Company decided to prove the commercial practicability of cyanamide, and ascertain the extent of the demand for it, before increasing their manufacturing power. After two years' experience, however, they realized that their product could be looked upon as an undoubted commercial success. In view of the possibility of it becoming a competitor with sulphate of ammonia as a fertilizer, the following particulars in regard to it, and to the plant employed in its production, which have appeared in "Gas Age" (New York), may not be without interest.

Cyanamide as a Fertilizer.

Commercial cyanamide is a bluish-black odourless powdered material, containing from 18 to 20 per cent. of ammonia, about 12 per cent. of carbon or lamp-black, and the equivalent of about 70 lbs. of slaked lime. It can be shipped in bags and stored for an indefinite period. Cyanamide nitrogen is readily soluble—96 per cent. dissolving in cold water—and is therefore available as plant food. On contact with the soil it reacts quickly, and forms first the organic compound urea, and then changes into the form of double ammonia compounds. These are not washed out of the soil, but are made available to crops by bacterial action and the solvent effects of plant roots. This action ensures a slow, steady supply of nitrogen, which has the advantage of not overfeeding crops a few weeks and then starving them, but of supplying this element throughout their principal period of growth. Since the soil duration of cyanamide nitrogen is from sixty to eighty days, crops are not fed when they should be maturing, and therefore ripen earlier and more uniformly. Every 100 lbs. of commercial cyanamide contain the equivalent of about 70 lbs. of slaked lime, which adds considerably to its value as a fertilizer. The lime costs the farmer nothing. Cyanamide is sold on the basis of the ammonia it contains, as determined by analysis. The beneficial action of lime is well known to farmers. A regular application of cyanamide to soil in good condition should ordinarily neutralize the acids occurring therein. The ease with which the lime content of the soil is kept at a desired point makes this fertilizer especially valuable.

Method of Manufacture.

The manufacture of cyanamide depends upon the chemical fact that calcium carbide at a high heat combines with atmospheric nitrogen and forms calcium cyanamide. Calcium carbide is made by fusing together lime and coke in an electric furnace. The carbide is placed in the ovens heated by electricity to a white heat, and nitrogen is led into them and there combined with the carbide, forming calcium cyanamide. After cooling, this material is ground, treated with water, and then put through a mechanical finishing process.

It will be readily seen that for economical production of cyanamide the plant must be located where electricity can be secured at the lowest possible cost. Before the installation of the plant at Niagara Falls, another matter of importance was to determine the kind of reducing gas to be used in preparing the nitrogen. After careful consideration, a coal-gas plant was decided upon, as the entire output of coke could be used in the manufacture of calcium carbide, and the coal gas gave the greatest amount of carbon content for use in the nitrogen ovens.

The nitrogen ovens consist of a series of vertical retorts heated by small individual furnaces. Copper oxide is placed in these retorts, and when they are brought to the proper temperature air is forced through them and the oxygen of the air combined with the copper as cupric oxide, leaving the nitrogen free. The air is then shut off, and as the oxide has gradually become foul during this cycle, coal gas is passed through the retort, which acts as a revivifier for the reducing agent. The nitrogen is then forced through pipes into the electric furnaces, where it combines with

the calcium carbide and forms calcium cyanamide, or commercial "cyanamid," as it is called.

COAL-GAS AND LIME PLANT.

The coal-gas plant has a capacity of approximately 500,000 cubic feet per 24 hours. There are seven benches of sixes, equipped with the Doherty bench fuel economizer and sectional silica retorts and settings. The purifying boxes are of the concrete outdoor type; and the gasholder has a capacity of 100,000 cubic feet. It is only used as a relief holder when the nitrogen ovens do not need the output of the benches. One of the interesting features of this installation has been the flexibility of the benches, inasmuch as when a larger output is required the heats are raised and the benches are forced to meet the demand, or the heats are lowered when for some reason the nitrogen ovens are shut down or not running to their full capacity. The first instalment of the plant for the production of lime used in the manufacture of the "cyanamid" consisted of six Doherty-Eldred kilns equipped with the Eldred process and induced draught. Six more kilns are now being installed, which will give the Company an ultimate capacity of some 144 tons of lime per 24 hours.

NOTES FROM ABROAD.

Natural Gas Waste.

It is estimated that natural gas to the value of more than 50 million dollars is wasted annually in the U.S.A. The Bureau of Mines has reported on this, and recommended a thorough investigation of the matter in all the oil and gas fields of the country. During 1913 the Bureau, with very limited means at its command, was able to stop a waste valued at some 10 million dollars. It is of opinion that 80 per cent. of the wastage could be easily prevented, and that from the other 20 per cent. gasoline could be extracted, and the gas burned in various useful ways.

Profit Sharing in America.

A new scheme for profit sharing has just been introduced by a Massachusetts manufacturing firm which employs over 3000 persons. A dividend, at the same rate as that paid to the shareholders, is to be given to each employee on the amount of his year's wages, provided that he has worked the whole year, and his work is satisfactory. In cases where a man has not completed a year's work, the dividend that would have been payable to him is devoted to a pensions fund. The merits of the scheme are said to be that it is easy for the employees to understand, and they can always find out what dividend is being paid, and know they are being fairly treated.

From Oil Gas to Coal Gas.

Owing to the continually increasing cost of oil, the authorities at Stollberg, a small German town, have decided that their oil-gas works can no longer be worked at a profit. They have accordingly decided to erect a modern coal-gas works, for an annual output of about 21 million cubic feet, capable of being doubled without any alteration of buildings. The retorts are to be machine stoked. The condenser, exhauster, and purifier plant is to be built for the initial output, while the tar, naphthalene, and ammonia washers and the station meter are to be large enough for the doubled output. According to the contract, the works are to be completed by the end of September.

Coal and Bye-Products in Germany.

It is interesting to note that some of the Berlin gas-works have concluded their new coal contracts at a reduction of about 2s. per ton on last year's prices. The coke market is poor throughout, and reductions in quotations at Hamburg have been followed almost everywhere. It is said that many industrial users have in consequence returned to the use of coke, but even so the large stocks will be difficult to clear. The report of the German Ammonia Society for February states that the demand for sulphate in the first half of the month was better, especially from abroad. Also the home sales were considerably higher than in February of last year. Large increases in benzol production actually exceeded the demand. Solvent naphtha and toluol were satisfactory.

A Remarkable Report.

Within comparatively small scope, the recently issued annual report of the People's Gaslight and Coke Company of Chicago contains some truly remarkable facts and figures. Despite large increases in the cost of raw materials, their gross earnings increased by $454,597 to $16,825,533 [£3,505,319]. During the year 1913, no less than 77 miles of mains were laid in extension, 29,349 meters were added, and 26,582 gas-stoves. All rights and interests in the Ogden and the Universal Gas Companies, in which leases were held before, were purchased for a cash payment. The report further contained plans for new plant costing 30 million dollars. Dividends payable were increased from 7 to 8 per cent. And, to crown all, new issues of stock and bonding arrangements were announced which, it is estimated, will cover the Company's requirements for the next fifty years.

Encouraging the Use of Gas.

An American lady, resident in Naples, has written an amusing letter to a local American newspaper, the substance of which is quoted in the "Gas Record." Complaining of the methods of Italian gas companies, she states that the gas bill for a month for cooking only was $4 (about 16s. 8d.). Of this, only $3·07 worth of gas had actually been used. Of the rest, 20 c. went towards the maintenance of the Company's plant, 36 c. as a tax to the government, 36 c. as a tax to the city, and a 1 c. stamp fixed by the Government. The meter is fixed for a payment of $5; the man who inspects it expects a tip; and if anything is found wrong with the supply, the consumer has to pay the cost of the investigation. A water-heater costs $42, and is considered anything but safe. This seems hardly likely to encourage the citizens of Naples to patronize the gas supply.

Proposed International Gas Congress.

A Joint Committee on this subject recently formed in U.S.A. held its second meeting on Feb. 6 in the office of the American Gas Institute. The Committee consists of representatives of the American Gas Institute, the National Commercial Gas Association, the Illuminating Engineering Society, and the District Associations. At the meeting the holding of an international congress was unanimously approved. It was recommended that invitations should promptly be issued to all foreign gas bodies to send representatives and to present papers; that steps should be taken to ascertain to what extent an exhibit could be made; that the same scheme should be adopted with regard to presiding officers as at the Paris Congress of 1900; and that the number of sessions should be fixed provisionally at five. It was also decided to raise a sum of $1000 from the Associations to meet the cost of invitations and publicity, and a Committee was appointed to prepare the invitations to be sent to foreign Associations.

Natural Gas in Alberta.

For a number of years the Canadian Pacific Railway has been using natural gas in Medicine Hat, Alberta, not only for ordinary lighting and heating purposes in the station yard and the numerous offices, but in the machine and boiler shops and other mechanical departments. The passenger trains in and out of the town for hundreds of miles are lighted with natural gas. Another well has just been started. It is of the customary depth—viz., about 1050 feet—to reach the gas bands; and a 13-inch hole, tapering down to 8 inches has been bored. According to the "Canadian Mail," this is the sixth well started at Medicine Hat this year; the other five having been drilled for the city. The open flow, rock pressure, and depth have averaged about the normal—viz., pressure, 550 lbs. to the square inch; flow, from 2,200,000 to 3,000,000 cubic feet each 24 hours; depth, from 1025 to 1300 feet, according to the contour of the surface. The City Engineer reports that there are now in operation twenty wells, the open flow of which in 24 hours is given at 42,725,000 cubic feet. The first well was bored in 1904.

Curious Meter Dispute at Marseilles.

The Tribunal of Commerce of Marseilles has lately given judgment in a rather interesting case. A manufacturer of the city had put into his premises some appliances for heating by gas which he wished to use in the winter months only. He entered into a contract with the Gas Company, and specified that he would not pay for the hire of the meter in the months when he thought he would not be using it. The Company, however, sent him in an account for 113 frs. 90 c. for gas, service-pipe, and meter hire from June, 1908, to March, 1913; and he declined to pay it. He was willing to pay 70 frs. 70 c., which, in his opinion, covered the cost of the gas consumed and the hire of the meter for the months in which he used it and the appliances. The Tribunal of Commerce came to the conclusion that common-sense principles must be applied in such a case as this. A man having anything on hire was, they said, liable for payment as long as he detained the article; and it was not the business of the lender to trouble himself as to whether or not use was made of it. They accordingly ordered payment of the amount of the claim, with interest and costs.

Gas at the Lyons Exhibition.

Readers are probably aware that the Municipality of Lyons has organized an international exhibition which will be open from the 1st of May till the 1st of November next. It will have a Light and Lighting Section, which will comprise everything connected with public and private lighting, as well as domestic and industrial heating. Class 88 will be of special interest to all engaged in the gas industry. It will include the study of light and and photometry; and its President will be M. Th. Vautier, a Professor at the Lyons University, whose name is well known as the President of the International Commission on Photometry. The Light and Lighting Section will be under the presidency of MM. J. Ancel, Chairman of the Lyons Gas Company, and J. Raclet, Chairman of the Société Lyonnaise des Forces Motrices du Rhône; and the Vice-President will be M. Auguste Boutan, the Managing-Director of the first-named Company and President of the Société Technique du Gaz en France. Class 88 will comprise the study of light in its widest aspect, and will include an exhibition of appliances showing progress in the dissemination of knowledge in regard to its production and utilization. The principal French makers of gas appliances have promised their co-operation in carrying out the exhibition.

We have received from Mr. Martin Bolt, the Chief Clerk of the Mining Board for the State of Illinois, the thirty-second annual report of the coal industry of the State; the statistics referring to the fiscal year ended the 30th of June last.

WORKS TOPICS—XXIV.

By "Modus Operandi."

Gas into the Holder Free of Cost.

So important an address as that delivered to the Manchester District Institution by Mr. J. G. Newbigging merits the closest attention on the part of all gas engineers. His clear-sighted optimism is very encouraging for the future of the gas industry. The goal he mentions—putting gas into the holder free of cost—will be a difficult one to attain. He qualifies this statement of opinion by limiting so high a standard of working to large undertakings adopting continuous verticals on a considerable scale with normal coal and residual markets.

It is clear that, before this stage of efficiency is reached, not only must the manufacturing charges be reduced to a minimum, but the residuals also must be increased in quantity, and must be sold more favourably. At the present time, it is possible, under some circumstances, to pay the whole of the coal bill out of the proceeds of the sales of residuals. The cost of putting gas into the holder is then limited to the manufacturing charges, which are not likely to be under 5d. per 1000 cubic feet, except perhaps under very exceptional conditions. How can this figure of 5d. be wiped out? The item consists of carbonizing wages, salaries, purifying charges, and wear and tear. It is clear that there is not much scope to reduce their total much below 5d. per 1000 cubic feet. The onus of doing this must, therefore, be borne by the residuals, which, to effect any startling improvement, must be handled with the utmost amount of skill, both technically and commercially.

The Intrinsic Value of Coke.

Taking coke first, the quantity made for sale cannot at present be increased much beyond 11 cwt. per ton of coal carbonized; but the cost of handling it can often be reduced, and its market value increased, by good work on proper lines. As the result of bad salesmanship, coke is often fetching prices much below its intrinsic value, comparing the B.Th.U. in coke with the B.Th.U. in coal. If in a certain district a well-known class of coal is fetching a certain price, its actual heat might with advantage be compared with that of the coke made by the gas undertaking. Usually on this basis the coal is unduly favoured, chiefly for the reason that the salesmanship on the side of coke has until lately been much at fault.

As a matter of fact coke, having a calorific value of 13,000 B.Th.U. per lb., is, in some respects, intrinsically worth more than a coal having an equivalent calorific value. In support of this statement, I need only refer readers to the excellent article on "Steam-Raising by Gas Coke" by Mr. E. W. L. Nicol, which appeared in the "Journal" for March 3, p. 567. Here were pointed out the great advantages possessed by our most important residual. We ought to be quick to appreciate these advantages, and see that the facts are brought to the notice of all coal users in our districts. There is no reason at all why, if this were done with enterprise and energy, coke should not fetch more per B.Th.U. of calorific value than the coal sold in competition.

Co-operation in Research Work.

The yield of liquid products per ton of coal affords much scope for improvement, and especially is this the case with ammonia. Before such improvement can be effected, however, a radical alteration in plant may be required. That we do not know; but the matter at any rate urgently calls for scientific research. Co-operation in investigations of this sort would be welcomed by scores of thinking men in the industry. A certain amount of such research work is done, but not a tithe of what should be done, even if considered purely from a financial standpoint. Individual effort on the part of busy men must inevitably be too spasmodic in character to result in substantial progress. Co-operation throughout the industry has now been extended in several directions. Could it not extend further to the investigation of problems which, if solved, would be of great financial benefit to the whole industry?

Mr. Newbigging's fascinating expression of opinion on the possibilities that exist in the future for gas undertakings is very attractive and stimulating. I am glad that he does not suggest that any substantial reduction should be made in the calorific value of gas. He does not indeed touch on this subject; but it does seem obvious that, so long as gas of a calorific value of something like 500 B.Th.U. can be made in the works for 6d. per 1000 cubic feet with a prospect in the future of reducing the cost to *nil*, it would be foolish to cut-down the quality of a product that is now made so cheaply. This has been argued before in this column; so I will not pursue the subject.

Advantages of Continuous Verticals.

Mr. Newbigging is a firm believer in continuous vertical retorts. From the figures he gives it is seen that the small installation at Droylsden is giving excellent results—better, in fact, than could be produced in horizontal retorts. With the latter it is practically impossible to obtain a high make of gas of the quality required, as regards illuminating power and calorific value, without at the same time diluting the gas with a high proportion of inert gases—nitrogen, carbonic acid, and oxygen. It is a fact that horizontal retorts cannot make a true low-grade gas, as Mr. E. W. Smith pointed out recently. This inability on the part of horizontals explains the statement of the Chairman of the South Metropolitan Gas Company, made some time ago, that they were unable to make a 14-candle power gas. This might have been qualified by adding "without considerable dilution with inert gases." This, it is well known, the Company will not do. In Mr. Newbigging's address certain difficulties in the working of continuous verticals are mentioned; but any engineer who has had experience of twelve-hour charges in old horizontals can view such matters with equanimity.

Mr. Newbigging's comparative statement of costs of manufacture of coal gas and carburetted water gas justify his view that "the manufacture of carburetted water gas will eventually be discarded, except for purely stand-by purposes."

Disposal of Coke.

The only serious difficulties in the way of such a step is the disposal of the additional coke thrown on the market and the provision of extra coal-gas plant. Mr. Newbigging estimates the extra coke at 1,600,000 tons a year, or 5 cwt. per gas consumer, and adds, "surely we have not exhausted our capabilities of finding new outlets for this additional quantity." The finding of new outlets should be undertaken prior to the dropping of carburetted water-gas manufacture, and the two steps should be taken successively. In several cases water-gas plant has been discontinued without taking this into account. Energetic measures and the expenditure of money on pushing the sale of coke should undoubtedly precede any active step in the direction of cutting-down water-gas manufacture.

In connection with the question of coke disposal, it would appear to be a comparatively simple matter to sell 7 or 8 million tons per annum, having regard to the enormous quantity of coal consumed for purposes for which coke is equally suitable. Mr. Edward G. Hiller, in his paper, on "Power Production in the United Kingdom," read before the Manchester Association of Engineers on Jan. 24 last, gave figures showing the approximate quantity of coal consumed for various different purposes. Here it is seen that of the 185 million tons used, a large part at least of the market is open to replacement by coke. The table showed that in 1911:

Factories	used . . .	60·7 million tons
Householders	,, . . .	34·3 ,, ,,
Iron and steel industries	,, . . .	32·1 ,, ,,
Mines	,, . . .	20 5 ,, ,,
Gas-works	,, . . .	15·4 ,, ,,
Railways	,, . . .	12·8 ,, ,,
Potteries, &c.	,, . . .	5·7 ,, ,,
Coasting steamers	,, . . .	2·4 ,, ,,
Total	. . .	184·9 million tons.

A study of the above figures gives the impression that, with a little enterprise, the paltry 7 or 8 million tons of coke produced by gas-works should be sold without difficulty.

There is no doubt but that many hundreds of thousands of pounds could have been saved by gas undertakings had they been able to have made coal gas instead of carburetted water gas during the past few years. It is probable, as was stated in Mr. Newbigging's address, that owing to the increasing use of oil as fuel and to the greatly improved methods of carbonizing coal, the cost of making carburetted water gas will permanently exceed the cost of making coal gas. It is also probable, as a consequence, that carburetted water gas manufacture will gradually be discarded; so that it is imperative that the problem of coke disposal should be seriously tackled by every gas undertaking.

Mr. Charles Carpenter, D.Sc., on Co-Partnership.

We have received from Co-Partnership Publishers, Limited, of No. 6, Bloomsbury Square, W.C., a pamphlet entitled "Industrial Co-Partnership." It consists of three papers read by Mr. Charles Carpenter, D.Sc.—at Oxford, in November, 1911, at the meeting of the British Association last year, and before the Social Science Club of the Leeds University in December—with chronological notes on British profit-sharing and co-partnership from 1829 to the present time. The papers, which have all been given in the "Journal," deal with the subject from three different standpoints—first, as regards the responsibility which labour co-partnership gives to the worker; secondly, the attitude of trade unionism towards co-partnerhip; and, thirdly, its relationship to industrial efficiency. The valuable chronological notes furnish particulars of more than 300 British profit-sharings chemes. Their distinctive features, length of existence, and causes of abandonment where they are no longer in operation, are clearly and reliably set forth. Mr. Carpenter acknowledges his great indebtedness to Mr. W. T. Layton, the Editor of the "Co-Partnership Journal of the South Metropolitan Gas Company," for his painstaking labours in compiling these data, which will constitute the pamphlet a standard work on co-partnership developments. They are preceded by an interesting note by their compiler. The price of the book, which is in paper covers, is 1s. net. Its issue now is very opportune, in view of the interest which is being taken in the subject of co-partnership as the result of the re-introduction of Mr. Hope's Bill and the address and discussion at the London Chamber of Commerce reported in the "Journal" last week (p. 678).

BRITISH COMMERCIAL GAS ASSOCIATION.

Report of the Executive Committee.

At the Meeting last Tuesday of the General Committee of the British Commercial Gas Association, the Executive Committee submitted a report, in the course of which it was stated that thirteen additional undertakings have become subscribers to the Association since the last meeting of the General Committee. This makes the total number of subscribing undertakings to date 430, as compared with 410 at the conclusion of the last financial year.

The Committee expressed the hope that the District Conferences now being arranged will result in a very material accession of undertakings to the list of subscribers; and they expressed their indebtedness to several of the Commercial Sections of the District Gas Associations for the work they have done in advocating the claims of the Association to support in their reports and at their meetings.

Increased Subscriptions.

The following increases in subscriptions by undertakings previously subscribing on less than the full basis of 2s. 6d. per million have been received: Birmingham, £750, as compared with £250 the first year and £500 the second year. Coventry, £125; being at the full basis rate, as compared with £20 in each of the former years. Hornsey, £40, as against £26 5s. last year. Portsea Island, £177; being at the full basis rate, as compared with £70 last year. Southampton, £102 10s., as against £25 the first year and £50 the second year. These proofs of the growing faith of the directors of gas companies and the members of gas committees in the value of the Association are heartily welcomed by the Committee.

Society of British Gas Industries.

The Council of the Society of British Gas Industries are, it is said, making special efforts to ensure an increased contribution from the Society to the Association during the current year.

District Conferences.

The District Conferences Committee have made arrangements for the following conferences:—

In the South-Western District, at Plymouth, on March 13, under the presidency of Sir Joseph Bellamy.

In the Manchester District, at Bradford, on March 17, under the presidency of Councillor Barraclough.

In the Northern District, at Newcastle-upon-Tyne, on May 1, under the presidency of Sir W. H. Stephenson.

In the Eastern District, at Cambridge, on a date to be fixed; and in Wales, at Newport, on April 23.

In connection with each of these conferences an evening lecture will be delivered by Professor Vivian B. Lewes, to which the public will be invited.

Great interest is being taken in these conferences by the District Committees, whose members (the Committee remark) are working hard to make them a great success; and it is hoped that they will prove of considerable value to the industry in each district as well as to the Association as a whole.

Coke.

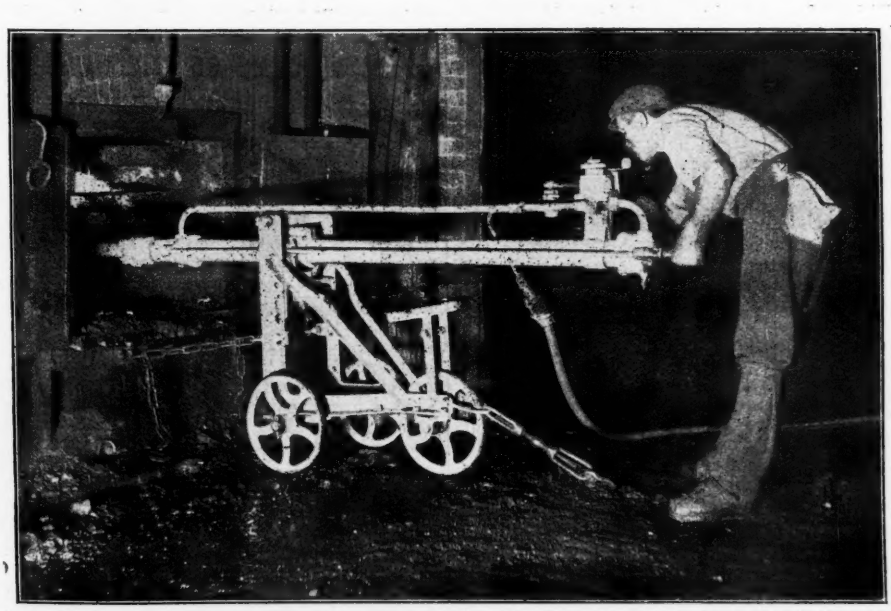
In accordance with the arrangements made at the last meeting of the General Committee, a conference on coke was held at Manchester on Dec. 16. As a result of the work of the Coke Sub-Committee, suggestions and draft advertising matter have been issued for the purpose of assisting members to push the sale of coke in their districts. It has been decided that the funds of the Association will not permit of a special national campaign for increasing the sale of coke to be initiated, but that wherever possible the advantages of the use of coke shall be referred to in the advertisements published by the Association.

GILL'S FURNACE CLINKERING MACHINE.

The two main considerations which prompt the design of labour-saving devices are the securing of increased economy in working (or increased efficiency, which is the same thing) and the attainment of improved conditions of work. With growing competition, efforts towards economy in the cost of production must become more and more insistent; and these efforts are doubly welcome when they result also in lightening arduous labour. A machine by which both these aims are served has been devised by Mr. G. M. Gill, the Assistant Engineer to the Commercial Gas Company; and it may be described as being, in a sense, a sister machine to the furnace poker which he illustrated in the paper read by him before the Southern District Association of Gas Engineers and Managers in November, 1912. Whereas, however, the latter machine is installed on the stage floor, the one that is the subject of this article—which is for clinkering the furnaces—is to be found, of course, beneath it.

Clinkering by hand is hard work; and when in conjunction with this fact it is borne in mind that it takes time, and that all the while the furnace-door is open fuel is being wasted, it almost seems strange that to Mr. Gill should belong the credit of designing the first clinkering machine ever brought out. It is applicable to all industries, and especially to water-gas manufacture; but it was in connection with an inspection of it in use in a coal-gas retort-house that the present notes were collected. A machine operated by hydraulic power has been used with very satisfactory results at the Wapping works of the Commercial Gas Company for the past fifteen months; but on the occasion of his visit, the writer had the opportunity of seeing at work a newly-designed compressed air machine, which is constructed on very simple lines. This, it may be said, was doing all that it is intended to do, with the utmost smoothness and rapidity. The furnaces at Wapping, it may be remarked, are fairly big ones. The actual grate area is about 5 ft. 6 in. by 3 feet; and each is sufficient to heat a setting of ten through retorts. As to the saving of time, and consequently of fuel in the furnace, the greater number of furnaces the men are able to undertake speaks for itself. The writer may, however, add that he saw the machine cut the clinker away from a furnace in 1½ minutes, though it should be stated that at the time good coal was being used at the works. But it is said that the time taken is never more than three minutes, however bad the clinker may be. In fact, it would be fair to assume that, with the aid of the machine, a man could do at least twice as much work as before.

When the machine is employed, the operation of clinkering is similar to hand work in respect to putting in false bars and removing the grate underneath them. Then the machine is brought along, and fastened by chains to a ring let into the ground at the back, and to the setting in front. On a furnace which was some-



Clinkering a Retort Furnace by Means of the Gill Compressed Air Machine.

what harder than the one previously referred to, the time occupied with the machine was taken, and was found to be 4½ minutes, including anchoring and unanchoring and wheeling it away. No special skill is required for the use of the machine, which can be safely left in the hands of the ordinary furnace-men; and it is absolutely under control, both as to length of travel and direction of stroke. The head of the machine is never in the furnace long enough to get hot; and therefore there is much less wear and tear with it than is the case with the old hand tool. Another point to be remembered is that the hand tool has to be long enough for the furnaces, and at the same time sufficiently heavy to prevent it from bending. Thus in building furnaces one has always been limited in length to the dimensions of a tool which it was possible for a man to handle. With the machine, of course, this consideration does not apply; and so there is no reason why furnaces should not be made longer. A further consideration in favour of machine working, too, is that the false bars (which are not water cooled) are not in the furnace long enough to get burnt away quickly. Clinkering is done every 24 hours; and there is a set of bars for each furnace, so that they are only used once a day. With hand work, these bars lasted about six weeks; and then they were turned round, and the other end was put in the furnace. Thus after twelve weeks the bar was done for. Using the machine, however, it is found that a bar will last for at least sixteen weeks before it is necessary to turn it.

Now as to the machines themselves. It has been mentioned that there are types for both hydraulic power and compressed air; and the latter can also be used for steam. For compressed air the pressure at which the machine works is 75 lbs. per square inch; but for hydraulic power a much higher pressure—about 450 lbs.—is needed. An illustration of the hydraulically operated machine was given with an abstract of the patent specification in the "JOURNAL" for Sept. 9 last [p. 709]. With the compressed air machine, there is a 2½ inch hollow ram, with a cylinder of 3 inches bore. On the head of the ram is the clinkering tool, which needs to be sharpened after clinkering about sixteen furnaces. This is practically all the attention it needs; but as it is simply screwed into the head of the ram, renewal, when required, is easy. To work the machine, the air is used expansively, and is to a certain extent reheated in the hollow ram, thus promoting economy in working, and, by means of a special valve, enabling the tool to be kept under perfect control. Ordinarily, a single cylinder and a ram operated in the same manner as a hydraulic machine would not be controllable; but by the extremely ingenious method adopted in the present case the ram was under absolute control. The strokes—which are, by the swivel action of the machine, directed by the man in charge (as shown by the accompanying photograph) to just the spot that needs clinkering—can be made as long or as short as desired; and while the blows are capable of being delivered with extreme force, the movements can, on the other hand, be made to be of the gentlest.

It may, in conclusion, be mentioned that the Gill furnace clinkering machine is being put upon the market by the Woodall-Duckham Vertical Retort and Oven Construction Company, Limited, of Palace Chambers, Westminster, S.W.; and the hope may be expressed that these notes will fulfil the purpose with which they have been written—that is, of showing that the appliance possesses money-saving and hard labour-saving qualities which entitle it to consideration at the hands of those who have charge of furnaces.

Utilizing Blast-Furnace and Coke-Oven Gas.

In an abstract of a paper by Mr. H. J. Freyn which came before the members of the American Institute of Mining Engineers at their last New York meeting, and of which an abstract appears in the current number of the "Iron and Coal Trades Review," reference is made to an innovation by Mr. H. A. Brassert by which a non-active blast-furnace is virtually transformed into a huge gas-producer, and utilized for gasifying small coke, raw coal, and coke breeze, on the principle of a slagging type of producer, using open-hearth slag as flux. In order to show what can be accomplished in the practical utilization of the surplus gases of a blast-furnace and coke-oven plant of modern size, the following calculations were made: Two isolated blast-furnaces, of 350 and 450 tons daily capacity each, are installed near a large city, together with a coke-oven plant of just sufficient size to furnish the necessary coke for the blast-furnaces. Coking coals of proper quality for making good blast-furnace coke can be delivered for 12s. per ton f.o.b. the furnace plant. The bye-product coke is charged to the blast-furnaces at 17s. per net ton (2000 lbs.), which price is about 5s. below the cost of standard beehive coke delivered in the locality. Coke-oven gas of a heating value of 550 B.Th.U. per cubic foot, but not subject to minimum candle-power specifications, can be used in the city for domestic purposes, and would bring in a price of 6d. per 1000 cubic feet. The prevailing cost of electric power is 1·2 c. (0·6d.) per kilowatt-hour distributed. With a practically unlimited power market, the total surplus from the blast-furnace and coke-oven gases of this plant can be absorbed by the established electric power company, which operates steam-turbine power stations of approximately 300 million kilowatt-hours total output per annum generated at a yearly use factor of about 38 per cent. With such favourable local conditions, the total quantity of coke-oven gas can be used for domestic or power purposes, or both; but to realize this, gas from some outside source must be used for underfiring the ovens.

NATIONAL TIME RECORDERS.

GOING about to different works, one notices the constantly increasing use of time recorders; and it is not, after all, surprising that this should be so, for they should prove satisfactory to both parties to a labour bargain. For instance, what opportunity for dispute between employer and employed can there be when a machine is provided which allows of each worker having a separate card (that can be afterwards used as the wages bill), on which is automatically recorded an entire week's time "in" and "out" as often as needed?

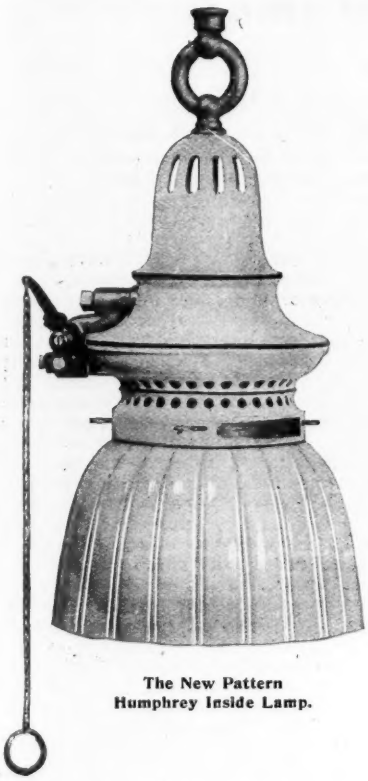
This is what the apparatus of the National Time Recorder Company, of No. 5, Blackfriars Road, S.E., does; and it does it in a remarkably neat manner. The system, it is maintained, is the most expeditious for the workpeople and the most labour-saving in the office; while an advantage on the score of expense is that the recorder will register an unlimited number of employees—thus accommodating increases in the staff from time to time. The speed at which workpeople register on the card machine is about fifty a minute. Each ticket has space for the name of the employee, and the date, together with the items for the weekly wage bill. There is also a column to permit of the wages being reckoned out daily; so that by the week-end all but one day is done. By this system, too, the workpeople can see the entries they have made. It is impossible to register the time ahead, or in the wrong day space, as there is a patent check action, by which if the card (the day spaces being beneath each other) is not inserted to the full extent that it should be, the machine will not register any time at all on it. Thus the machine obviates any mistakes in the registration which would necessitate the checking of each time record throughout the week to discover errors.

The "National" patent time recorders are manufactured at the Company's own works in London, from the best British material; and they include a specially constructed clock movement on the dead-beat principle, which renders the time-keeping absolutely correct. Two card-racks are provided—for "in" and "out." The employee simply takes the card bearing his name and number from (say) the "out" rack, puts it in the machine to get the time printed on it, and then places the card in the corresponding pocket of the "in" rack. These two racks oblige the employees to form a queue—which is advanced as the reason why the speed of over fifty registrations a minute can be easily maintained. There is no need for the card-racks to be in close proximity to the time recorder. When desired, the recorders can be had with bell-ringing attachments for automatically denoting the time for commencing and leaving off work—to ring at a single given spot or in all departments of the works simultaneously.

It is claimed for the "National" system that it is simple, accurate, and just both to the workman and his employer. No higher qualities than these could be possessed by an instrument intended to serve such a purpose as a time recorder. The system can be adapted to varied circumstances; and one machine can be had which is constructed to register the time occupied on different jobs in a day on a single card for each workman, so as to take the place of the usual daily time sheet. There is space for recording fourteen separate jobs in a day; and particulars of these can be noted on the back of the card. The Company also make an autograph recorder, which prints the day of the week, the hour, and the minute, on the paper before (not after) the signature is written. Indeed, it would be difficult to find conditions under which a time recorder was required which could not be met by the National Time Recorder Company.

NEW FORMS OF THE HUMPHREY LAMP.

WHERE a lamp is required that has an appearance out of the ordinary—and a good-looking appearance too—the one illustrated is worth consideration. The top part of the lamp is cast, the lower part of the top is quite a heavy spinning, and all the internal metal parts are solid in their design; so that an excellent life for the lamp is assured. The usual Humphrey lamp features—usual in modern types—are included. For example, by removing a single bolt all the vital operative parts connected with the gas and air supply can be removed. The power of regulation is such as to supply a wide range of lighting power with the one lamp; and any nozzle can be fitted so as to take from a medium size mantle up to a mantle giving a light of 600-candle power. The lamp has only one chain pull for lighting and extinguishing; this being accomplished by a ratchet device. The lamps are finished in white and gold lining, or chocolate and gold lining. But a special feature is the range of beautiful glassware which is being supplied for these lamps at a price that is really surprisingly low. Samples which the sole representative in this country—Mr. Herbert N. Clark, of No. 28, Brooke Street, Holborn—has shown us are not only pretty in design, but are of a whiter colour than any German or English made lamp glass that we have seen. It is really very attractive. The glass shade on the lamp illustrated (there are other artistic designs) is held in position by an automatic spring. With this open-bottomed shade, an inner glass is used, supported by a



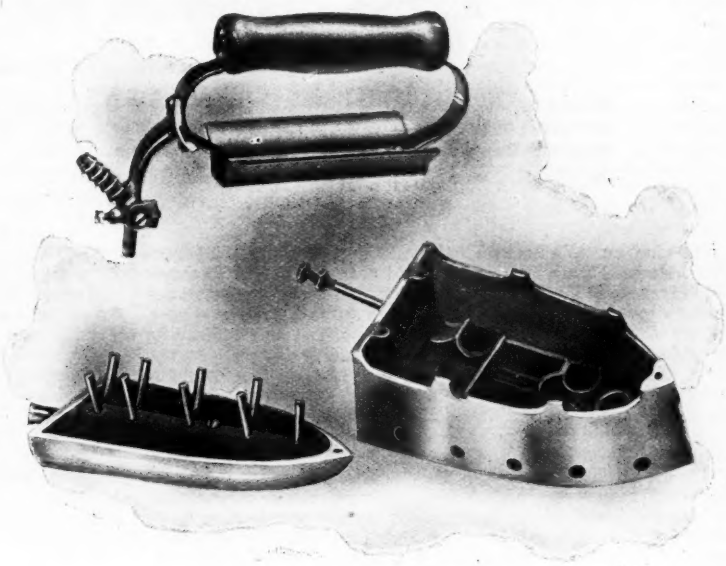
The New Pattern Humphrey Inside Lamp.

bayonet joint, and with air-inlets just above the small portion at the bottom, which is frosted to prevent glare. The lamp, if desired, can be fitted with a reflecting-shade. The same lamp, fitted with two lights, is supplied with a totally enclosed globe made of the same refined glass. This lamp also looks good; and is good in all respects—particularly in illuminating efficiency as well as in appearance.

THE HUMPHREY GAS-IRON.

THE gas-iron is a useful thing with which to develop the domestic employment of gas; but gas undertakings in this country have not hitherto bestowed on the promotion of its use the assiduity that obtains in some other countries—in, for instance, Germany and America. The gas salesmen appear to devote their energies almost exclusively to the "larger game"—to lighting, cooking, heating (room, water, and industrial), and power; but the application of gas to ironing, save in connection with laundries, is largely neglected. This is speaking from an experience in four gas companies' areas. In a gas-supplying district containing thousands of residences, the gas-iron ought to make up a load that is not negligible. To ascertain the reasons for the apparent neglect, inquiries have been made of some gas men; and it is learned that they are not altogether satisfied with the domestic irons with which they are acquainted. The want of any uniform heating and clumsiness are among the points they mention as being against such irons as consumers in their areas have tried, or that have been experimented with in their own households. Mr. Herbert N. Clark, of No. 28, Brooke Street, Holborn, has introduced to our notice the Humphrey gas-iron, which appears to have points about it that should obtain for it a trial, and, if found efficient, should be pushed by gas undertakings. It is an iron for which a high efficiency is claimed, on a low consumption of gas; it is easily handled; it is uniformly heated; and it is well heated at that critical part, the point of the iron. It is nickel-plated; and so it is easily and always kept clean and ready for action.

As the illustration shows, the iron is in three parts. The bottom part of the iron is specially cast, so as to ensure good heat storage and retention. The second part (shown upside down in the illustration) contains the bunsen tube, from which project nine little tubes which direct the heating-jets well over the bottom of the iron. There is also an adjustable tube in the iron by which the air supply can be regulated to the gas supply. Another point of importance is that there is a device by which, when the iron is put down temporarily, the gas supply can be turned off, leaving only tiny jets alight, consuming in all merely $\frac{1}{2}$ cubic foot of gas per hour. When in use, a consumption not exceeding 3 cubic feet of gas per hour is all that is required. Experiments have been made to see whether the iron would light-back; and there was failure. The weight of the iron is $6\frac{1}{4}$ lbs. Included in the moderate price is 6 feet of metal tubing, and a stand for the iron. It is against our practice to mention the price of goods which receive notice other than in the advertisement columns; but, in mentioning that the price of this iron is 8s. 3d. (including tubing and stand), we do so with the object of making a point. It is that for



The Parts of the Humphrey Gas-Iron.

ordinary purposes in a household one gas-iron suffices, whereas, in order not to lose time with ordinary solid irons heated by the kitchen fire or on iron gas-heaters, more than one iron is necessary. The convenience of having only one iron, with the heat uniformly maintained, and not a diminishing quantity, must be a convenience, and contributory to good work.

THE STRENGTHENING AND IMPROVING OF GAS-MANTLES.

Mr. Israel More has devised a process for treating gas-mantles so as to lengthen their life and increase their light-giving power; and he has patented it for France [No. 462,488 of 1913]. As announced in the "JOURNAL" for Sept. 16, 1913, Mr. More has applied for an English patent; but it has not yet been granted. He first makes a mixture consisting of 85 grammes of kaolin in fine powder and about a litre of filtered water, and then another consisting of two teaspoonfuls of permanganate of potash dissolved in 56 grammes of filtered water; and he adds two teaspoonfuls of the latter mixture to the former. In applying this combination, a new mantle is held by a piece of wire or string attached to the top, or in any other suitable way, and dipped into the mixture. It is afterwards thoroughly dried at a very moderate temperature. After the immersion, it can be either put aside or brought into use at once; it being burnt off in the usual way before the first ignition.

In order to preserve the mantle, it is advisable to repeat the dipping; and it is claimed that the two immersions suffice to increase its life and usefulness much beyond the average. In the case of mantles which are cracked or about to tear, the inventor dips them at once when they are strong enough to support the treatment. If not, he directs a jet of the mixture just a little above them, so that it falls upon the surface in the form of spray or dew. When this is dry, the mantle can be dipped once or twice into the mixture; and it will then, it is stated, be practically a new one. The inventor has found that some kaolins are richer than others. But the strength can be reduced by the addition of a little water.

Midland Junior Gas Association.—Arrangements have been made for a visit by the members on Saturday, the 28th inst., to Leicester, to inspect (by permission of the Gas Committee) the Glover-West vertical retorts at the Belgrave Gate works. The party will be met by Mr. Hubert Pooley, the Engineer and Manager, and have been invited to tea, when it is hoped that Alderman Smith, the Chairman of the Gas Committee, will be present to welcome the members.

Scottish Junior Gas Association (Western District).—We learn from the Hon. Secretary (Mr. David Fulton, of Helensburgh) that a joint visit with the members of the Eastern District Division will be paid next Saturday afternoon to Messrs. Young's Paraffin Light and Mineral Oil Company's works at Uphall, West Lothian. As already announced, the annual meeting will be held in the Royal Technical College, Glasgow, on Saturday, the 11th prox., when Dr. W. B. Davidson will deliver a lecture. At the annual dinner after the business, Dr. Davidson will be the guest of the Association. Though the date of the meeting is the Saturday preceding the Glasgow spring holiday, the Council express the hope that there will be a full attendance of members, in order to show their appreciation of the honour done to them by their distinguished countryman.

BRITISH COMMERCIAL GAS ASSOCIATION.

District Conference at Plymouth.

UNDER the auspices of the British Commercial Gas Association a conference, which included gentlemen interested in the gas industry n all its varied phases, was held on Friday last in the Royal Hotel Assembly Room, Plymouth. The gathering was the inaugural meeting of the South-Western branch of the Association, and was well attended. Sir JOSEPH BELLAMY, the Chairman of the Plymouth and Stonehouse Gas Company, occupied the chair.

The CHAIRMAN, in his own name and that of his fellow Directors, welcomed those present, and said that the British Commercial Gas Association had done most valuable work in bringing the industry together. In the past they had been divided, and very seldom met for the exchange of views and ideas, and suffered in some cases from the prevalence of small local jealousies. As the result, there was no cohesion in the promotion of their common interests or in opposition to legislation which adversely affected them. Had such an organization been in existence when electric lighting was first introduced, the gas companies would probably have been given the right to supply electric light in the towns where they desired to do so. Parliament had imposed obligations and restrictions upon gas companies on the theory that they had a monopoly in lighting. It had imposed restrictions with regard to price and dividends and the building-up of proper reserves, on the assumption that gas lighting was a monopoly. This was no longer the case; and had they been organized at the time, the gas companies would probably have been able to supply electricity as a branch of their business, on a sliding-scale as they supplied gas—sharing surplus profits between shareholders and consumers. When the restrictions now existing were imposed on gas companies, it was not thought necessary for the protection of the shareholders that proper reserve funds should be maintained. Under the altered circumstances, he believed the time had arrived when Parliament should be asked to remove some of the restrictions which now pressed rather unfairly upon gas companies in their competition with electricity. They were put upon them when they had a monopoly, and were designed to protect the consumers against conditions which no longer existed. The companies should now be allowed to build up such reserve funds as would protect the interests of the shareholders, while not placing any undue burdens on the consumers. In welcoming the South-Western branch of the Association to Plymouth, he invited them to visit the gas-works, where Mr. Percy Hoyte, the Engineer and Manager, and the other officers of the Company, would be delighted to show them every part of the plant, and explain anything in which they were interested. It was the Company's effort to be in the front rank, and as new ideas came along they took advantage of them. He had no doubt the Association would be of considerable advantage to the industry; and he hoped that all companies and gas committees would become subscribers to its funds. In the sister town of Devonport, where both the gas and the electricity undertakings were in the hands of the Corporation, the Gas Committee had not yet seen their way to join the Association; but it was not quite fair that so important an undertaking in this part of the country should stand aloof and enjoy the benefits without bearing part of the burden. They had to meet the competition of the electric light, to watch over the interests of the industry in regard to legislation, and to educate public opinion. All this could not be done without money; and the more who subscribed, the less would be the burden on the individual subscribers.

THANKS TO THE PLYMOUTH GAS COMPANY.

Mr. SHEPHERD (Bath) moved a resolution thanking the Plymouth Gas Company for their reception of the Association, and the arrangements made for the conference. He remarked that, as a native of Devonport, and through his former association with the Devonport Gas-Works, he was well acquainted with the Plymouth Company, and knew that they had always had an exceedingly strong Board of Directors. He remembered the surprise which was caused when the price of gas in Plymouth came down to 2s. 6d. per 1000 cubic feet. To-day it was 1s. 9d., which spoke volumes for the management of the Company.

Mr. H. T. DOBLE (Tavistock) seconded the motion, which was carried.

WORK OF THE ASSOCIATION.

Mr. C. STAFFORD ELLERY (Bath), the Chairman of the South-Western Conference Committee, said he hoped one result of the conference would be to bring in as subscribers to the funds of the Association those who, in this part of the country, still held aloof from it. The Association was just over two years old; and he thought they must all admit that, for so young a body, it had done remarkably well. They had in connection with it 77 per cent. of the industry, as represented by make of gas, which was a great tribute to the work of the Executive Committee and the indefatigable Chairman, Mr. Goodenough, and the Editor, Mrs. Cloudesley Brereton. The income last year was £20,000; while working expenses had been kept down to the very moderate sum of about 5 per cent. of the income. Their aim was to show the public, by means of advertising, lectures, articles, pamphlets, and other methods of publicity, what service the gas industry could render in the way of lighting, heating, and the supply of power. There was a time not far distant when the manager, having made his gas, allowed it to take care of itself. It had been said that he threw it at the consumers' heads. They could not now leave it at the outlet of the holder. At the last meeting of the Directors of the Bath Gas Company, they had a discussion on window dressing—a subject which would not have been thought of in connection with the industry 25 years ago; and the fact that such a discussion could take place now was a sign of the times. It was surprising to find how little people knew about gas, and how to get the best value out of it. The work of the Association was intended to be educative, so that all who were interested in the sale and use of gas might learn how to make the best use of it. In this connection, it was interesting to note the wonderful advance which had been made since the days when they aimed at realizing 3 candle power per cubic foot of gas, and to-day when they offered the public 60 candles for every foot of gas consumed. There was, however, a very large margin between what the consumer actually got and what he might have if he knew more about it. The waste was enormous; and one aim of the Association was to reduce it as much as possible, so that the public might get the full benefit of what they were paying for. In the industrial application of gas, as well as in its use for lighting and cooking purposes, there was room for much progress to be made; and in this matter it was not the public only who needed education. Personally, he had gained a great deal of information from perusing the printed matter circulated by the Association; and gas companies must recognize that they must rouse themelves in the matter of selling gas. Another aim which the Association had was that of smoke abatement. In Bath, with a population of about 70,000, they had 13,000 gas-stoves on hire; and the total in use was about 15,000. One would think that this must have an appreciable effect on the atmosphere of the city. But there was still a surprising amount of smoke polluting the air; and he hoped that, as result of the work of the Association, they would have a much greater use of gaseous fuel, and a further reduction of the pollution of the atmosphere. Then there was the use of gas in the home, and the effect which it had upon the domestic problem. Mrs. Cloudesley Brereton had dealt with this in the most instructive and entertaining manner; and the more they looked at it, the more clear was the fact that the use of gas was going to help in the solution of the problem of domestic labour. A very interesting comparison might be drawn between two houses, in one of which gas was used for all the purposes for which it was adapted, and another in which it was disregarded. The contrast between the griminess and work of the one, compared with the cleanliness and freedom from worry in the other, would be startling. In Bath, it was their ambition that the consumer should put his penny in the slot and have no further trouble for lighting, warmth, or cooking. He could not see why it should be necessary for any household to use coal when gas could be had for less cost, and offered so much greater facilities for the solution of the domestic problem. Thus the aims of the Association were receiving their support, not only because they tended to the development of the industry, but because in gas they had an instrument of public service. If public men could be induced to see that in gas there was in many ways an instrument of real public service, the Association would have done good work. They could only achieve such an object by co-operation. They in the Provinces ought to be thankful to the London Companies for what they had done in popularizing the use of gas before the Association started; and it was necessary that now they should recognize that the greatest amount of good could only be achieved by united effort. Mr. Mason, the Secretary of the Association, had informed him that 2,600,000 items of literature were sold last year, and that they had a large sale of the "Bulletin" of the Association every month. He should like to see this periodical more and more used for the education of salesmen; for, if the public were to be properly served, it could only be through well-trained and suitable men, who could be sent into the homes of the people to lay before them the advantages of gas for various purposes. As to the undertakings which had not yet joined the Association, he would only say that, in common fairness, they should pay their share of the cost of benefits which were being enjoyed by every district, because the advertisements appearing in papers of wide circulation were appealing to the residents of all towns, whether large or small. They wanted to obtain the co-operation of professional men—especially of medical men. The old prejudice against gas-fires was dying-out among doctors; and he was rather struck by a fact which had come to his knowledge that one of the leading physicians in Bath had gas in every room of his house; while in the nursing home of one of the leading surgeons coal-fires had been discarded and gas-fires installed. The latter were much valued, because of their cleanliness and the regular heat they gave. They also required the

co-operation of architects and builders. Why should it be necessary, when a person wanted a cooking-stove, to stand it in the middle of the room, or some other inconvenient position, instead of in a suitable recess? It was simply because the old ideas of coal-fires prevailed with architects and builders; and those who were interested in the gas industry must see that full justice was done to gaseous fuel. Surely the time had come when provision should be made in every new house, by the laying of pipes, and in other ways, for the consumption of gas. For the work which the Association had to do, £20,000 a year was not enough. They had only touched the fringe of it as yet. Advertising, to be effective, was costly. They ought to undertake more research work; and they wanted also to bring the advantages of gas under the notice of readers of the trade journals, and many others whom they had not yet reached. It all meant money. The suggested basis of subscription was 2s. 6d. per million cubic feet of gas; and they ought to induce all companies and gas committees to subscribe this amount. They had the testimony of Glasgow that in that city the consumption of gas had gone up by leaps and bounds since the publicity campaign had begun there; and what was done in Glasgow should be possible in other towns.

Advantages of Advertising.

Mr. F. W. Goodenough (London) said that, although he was present as Chairman of the Association, it was not with any intention of leading or controlling this local conference. It was not a London Association, but a British Association, for the benefit of the whole of the gas industry in these islands; and his excuse for being present, if it needed one, was that in coming to Devon he was coming to his native county. He had to move a hearty vote to Mr. Ellery for his address. Reference had been made to the gas undertakings which did not subscribe to the funds of the Association. He hoped some of these were represented at the conference, and that they would come to the decision not to continue to stand outside. The directors and committees of the non-subscribing undertakings had got to be convinced that the policy of the Association was right. It was always strong proof of a man's faith in any cause when he gave money for it; and they in the Association had every reason to feel satisfied with their progress when they remembered that in two years they had secured the support of nearly 80 per cent. of the industry. Many who came in at first with hesitation and a moderate subscription were now subscribing the full amount of 2s. 6d. per million cubic feet of gas made. This was encouraging, as it showed their confidence in the Association and approval of the work it was doing. Mr. Ellery had said that 2s. 6d. was not a large sum. As nearly as possible it was one penny per gas consumer per annum; and to spend this sum on national publicity could not be regarded as a serious tax upon the industry. They could profitably spend double the amount that was being subscribed. It was an axiom in advertising that every thousand pounds spent beyond the first thousand pounds was more profitable than the last. They could spend £5000 on an advertising proposition and lose by it, and they could go on and spend £10,000 and then reap the full harvest; so that every thousand pounds spent added more than proportionately to the value of what was already spent. A great deal more than advertising was being done by the Association; but this was an important branch of the work. They had done a considerable amount in advertising in the national daily newspapers, such as "The Times," the "Daily Mail," and the "Manchester Guardian"; in the Society weekly journals like "Punch," "The Queen," the "Ladies Field," "Tatler," and "Sketch;" in the monthly magazines; and in journals devoted to the interests of the medical profession, architects, builders, and so on. The periodicals that came in the last class were little known outside the circles to which they especially appealed; but for the purposes of the Association they were most valuable. They also supplied articles for publication in these journals. The result was that medical men and others had become interested in gas for purposes of heating, lighting, and ventilation. The number of articles published in the Technical Press had been most satisfactory. There were many other trade papers, devoted to the interests of the grocery trade, the drapery trade, and others with which they had done something and wanted to do more. Literature had been issued to members of various bodies like the Royal Sanitary Institute; and a considerable amount of correspondence had resulted from this. How were they to measure the value of this national publicity? Its value could not be ascertained by the number of inquiries received, or the direct orders given, in any particular district. It was to be seen in the atmosphere created—the suggestion constantly conveyed to the minds of readers that there was life in the gas industry, and advantages in the use of gas. Though the Association did not undertake advertising in local newspapers, they provided material for district publicity work and placed at the disposal of District Associations and individual gas managers the advantages of expert knowledge. One advantage of this was that the particular district had the advantage of the accumulated effect of the same design and appeal being seen by the reader in many places, and so the suggestion came into the minds of the people. In his opinion, those who spent most in this way in their own districts reaped most benefit from the Association's larger scheme of advertising. Though, as Mr. Ellery had said, the sales of the Association's literature were large, they should be larger, for it was a very valuable adjunct to advertising. The expert advice of various branches of the sales managers' work should have wide circulation; and the "Bulletin" should be in the hands of everyone who had anything to do with salesmanship or advertising. It was a means for the interchange of views among those engaged in the industry; and it would be of still greater value if it were made of more use in the pooling of individual experience for the benefit of everyone. Another direction in which the Association had been of great use was in offering defence against unwarranted attacks on the industry. Untruthful statements were not circulated so freely as they used to be, because it was known that they would be challenged; while they had succeeded, by means of papers by Dr. Rideal before the Congress on Domestic Science, by Professor Lewes before the Institute of Sanitary Engineers, by Professor Leonard Hill, and by the "Lancet," in removing some misconceptions as to the use of flueless stoves and the value of gas-fires giving radiant heat as against other forms of stoves giving only convected heat. The day had gone by for sitting still and waiting for business to come. Though some gas undertakings had not yet realized it, it was necessary to preach the gospel of progress. It was a mistake to suppose that because they had had no difficulty in paying their dividends in the past that it would always be so. Much recent progress had been due to the introduction of the slot-meter; and this was not going to be repeated. They had to find increased business in new directions. They had heard that there was an average of one gas fire or stove to each house in Bath. It was a high percentage. But why should there not be six to each house? An enormous field for increased consumption was to be found in the use of water heaters and fires; but to exploit it, they must advertise and canvass and make full use of all modern publicity methods. To those companies which paid maximum dividends and were disposed to rest and be thankful he would say that they had an obligation to the public, and that it was their duty, equally with others, to adopt a progressive policy.

Mr. W. N. Westlake (Exeter), in seconding the vote of thanks, spoke of the valuable service Mr. Ellery had rendered in the formation of the South-Western branch of the Association. As to the value of the work which was being done, they had received some evidence in Exeter, where, in endeavouring to interest professional men in the use of gas, they had found many of them well posted in the subject. On inquiry, the source of their knowledge had been traced to the advertisements or literature issued by the Association. He also found that far greater interest in their work was taken by the staff since the Association began to direct attention to its wide scope and great possibilities.

The resolution was carried.

Local Publicity Work.

Mr. J. Armstrong (Ilfracombe) then read his paper on

INCREASE OF SALES BY LOCAL PUBLICITY.

It is truly said that we are living in a commercial age, and that gas undertakings are among the last to accept the principle of such an age, because of their privileged position in the past. It is not therefore an easy matter to change the attitude which the public evince towards gas undertakings—namely, that they give as little as possible, and take as much as they can. Those of us who are "living the age" know that this is not true. We discern the real desire of the gas undertakings, but, unless we make known that desire, we cannot blame the customer or consumer—who, in the majority of cases, is the lady of the house—for thinking otherwise. We are confident we can render good service in labour saving, freedom from worry, and in the many ways in which gas can be profitably used in the home or workshop. It is surely then a matter of publicity and regular education which form the antidote for public prejudice and ignorance.

Publicity should be the motto of the gas industry of to-day. Everyone should feel compelled to accept this motto; and that the British Commercial Gas Association, which might aptly be described co-operative publicity, came into being not a day too soon is now freely admitted. We ought to be grateful to Mr. Goodenough, as pioneer of the movement, for his gratuitous and whole-hearted help. The valuable assistance which he at all times renders is not confined to the Committee Room, but extends to those who, like myself, seek his aid and advice outside the Association.

That daily newspaper and magazine advertising is good, nay excellent, I am convinced; but I do not think we can attach the same importance to the advertisements in the local weeklies. In the town in which my Company operate there are two local newspapers, and in each, every week, we have half-column advertisements, which are varied in their construction every three or four weeks. While it is not possible to state definitely what has been accomplished by these, I can say that consumers of ours who have sought information from the British Commercial Gas Association, through their advertisements in the national publications, have been purchasers of appliances, and, in consequence, have increased their gas consumption.

It may be said, and quite truthfully, that the advertisements in the local papers were not made sufficiently attractive. I admit quite frankly that I have spent hours in the endeavour to draft advertisements, and have been very dissatisfied with the result. The average gas manager in small-sized works cannot expect to be a specialist in all work—much less in advertising; and as the Association will readily supply advertisements conceived and drafted by experts, it is for this section of our business that membership of the British Commercial Gas Association becomes

a valuable asset, since local advertisements secure individuality of the undertaking, and ought, therefore, to be continued.

I am optimistic enough to believe that not only will the British Commercial Gas Association be an indispensable factor in the commercial and educational machinery of the industry, but will be the "central laboratory" to which all appliances may be submitted for its "hall mark," as well as maintaining its own staff of experts to dispatch to the Provinces, for the purpose of affording that help which is often required on special occasions or lectures. That this latter may be expected is evidenced by the lecture by Professor Lewes to which we shall have the pleasure of listening, and also by the fact that the Association now possess a staff of lady demonstrators.

Qualifications of Demonstrators and Staff.

May I suggest (because our experience with lady demonstrators has not been as successful as we anticipated) that the British Commercial Gas Association might institute a thorough inquiry into the qualifications of these ladies; for, unless they are possessed not only of a thorough knowledge of their subject, but also tact, they do more harm than good, especially in the better-class districts. The latter remarks are not limited to lady demonstrators, but extend to the departments distribution staff, because, after all, the public only know the undertaking through its points of contact. In small undertakings, it is very desirable to have fitters who are intelligent and courteous, cleanly in their work, and possessed of an enthusiastic spirit. They should be impressed that, while they are sent to do work that may have been outlined by official instructions, they should evidence their desire to do what the consumer wishes, and every opportunity should be taken by them of informing the consumer what can be done by the use of gas.

In order to stimulate the fitter's interest, a commission or bonus might well be paid him for all new work which he obtains. "It is the hope of reward that sweetens labour;" and I have found the application of this principle to be productive of excellent results. It may be said that undertakings which have decided to adopt the forward movement in the commercial portion of their business find it difficult for their employees to adapt themselves to the new conditions. Well, only one of two alternatives is open—to educate or to scrap. The latter is a distasteful method; and the former throws a deal of extra work and worry on the manager, whose duty it is so to educate in small undertakings. This, however, has its advantages, for to teach necessitates a thorough knowledge of one's subject; and as the quality of service rendered cannot rise higher than its source, the manager must live his policy of service after preaching it. Then follows a spirit of co-operation and enthusiasm; and managers of many undertakings are now paying as much attention to the quality of service rendered as they are careful of the quality of gas itself. The employees do not take long to observe this; and when it is seen that it is the determined attitude of the undertaking they ultimately realize this, and become valuable walking advertisements.

In our own case, we avail ourselves of all lectures which are offered by manufacturers' representatives; and I make the most of every opportunity which presents itself to me for discussing with the fitters the various problems and difficulties with which they are confronted. We have found it profitable, after all work has been completed, to send an inspector to examine it, and to make it his business not only to see that the work is satisfactory, but that the consumer also is satisfied. Instructions are given to our men always to err on the side of largeness in respect of pipes fitted.

Representatives of the Company periodically call at every house for the purpose of soliciting orders, and to make inquiries of consumers as to their general supply. To wait for complaints is not a wise policy, nor is their absence an indication the consumer is satisfied. It is well to realize that any defective appliance which, because of the defect, drops out of use means a reduced consumption, and therefore, by parity of reason, a loss of revenue. It is notorious that the average consumer, when the light given from an incandescent burner or the pressure at the cooker are not what they should be, blames the quality of the gas; whereas it is invariably the fittings or appliances which are at fault. Our experience has often proved this to be the case. After having the faults remedied, the consumers have passed on the information to their friends. The best and cheapest advertisement is a satisfied consumer.

Where, as is often the case, the management of the works is separated from the selling of its product, it is very essential that the heads of these departments should meet frequently for discussion and the exchange of ideas. It is useless to possess a good sales department and at the same time to dispense an inferior article; for while it is said "That no producing organization can exist unless its product is disposed of," it is equally true that such product should be of the very best of its kind, which, in the case of gas, should be constancy of purity, heat value, pressure, and its adequacy.

These are days when efficient organization is not only desirable, but indispensable. We cannot afford to create any jealousies among the heads of departments. It must not be thought undue interference if one or the other suggests something outside his department. All suggestions or ideas which may be given by each, should be accepted freely and thankfully, because all desire, or should desire, the prosperity of the undertaking; and true co-operation is the first step to success. The functions of the human body are analogous to those of business. They are an indication of the manner in which the body is conducting its work; and the function of the different organs will disclose how the whole is affected. Just as when the function is faulty in an organ it throws the whole body out of organization, so, unless business functions are well organized and working smoothly, no good results from the whole can be expected.

Show-Rooms.

Many interesting papers have been written dealing with show-rooms. They have now become the rule rather than the exception; but I cannot refrain from remarking how badly organized some of them are. I have noticed that in certain towns the show-rooms have been anything but attractive, untidy in appearance, and lacking in cleanliness; while the windows have been filled with all manner of appliances, arranged on quite the hit-and-miss principle. If I were seeking knowledge as to the uses to which gas is applied in these towns, I should conclude from the appearance and arrangement of the show-room that gas was not the desirable commodity that we and the discerning public know it to be.

The show-room window should not be overcrowded. In my opinion, one line only of apparatus—such as fires, cookers, or water-heaters, each in its own season—should be displayed to full advantage; and all advertisements in newspapers, or circulars, should concentrate on this one line. Has it ever occurred to you that your local draper, when desirous of making a special sale—say, ladies' dresses—does not cram his windows with every kind of article he sells, but brings into view dresses only, or whatever article he may be impressing on the public eye. Our position is similar, for we are only shopkeepers on a larger scale.

It is very desirable to have in the show-room an assistant who is not only smart in appearance, tactful, and obliging, but who, when promising a consumer that complaints or additional work shall be attended to, or done at a certain time, will take care that such promise is fulfilled, and, further, that he does not overstate the capabilities of the appliance which he may be endeavouring to dispose of. Nothing makes the consumer more dissatisfied than an unfulfilled promise and lack of prompt attention, or to find that the efficiency of an appliance purchased is less than has been stated.

All literature for which the undertaking is responsible should be on good quality paper, neat in appearance, and the facts plainly stated. We should tell the consumers what they want to know, and not what we want to tell them; and care should be exercised to guard against extravagant statements, especially when comparing with our opponents, for gas has nothing to fear, but more to gain, when the truth is frankly stated.

Value of Local Popularity.

It is very good practice to test as many appliances as possible with prevailing local conditions. In our own case, we have found the results both instructive and interesting, particularly those relating to incandescent burner efficiencies. Every opportunity should be taken of co-operating with the local authority, education authority, or other public body which has for its object the promotion of the welfare of the community, because a too parsimonious spirit in the lending of appliances, delivering of lectures, or assisting generally will not secure the public support which is greatly to be desired. In this connection, we have been successful in obtaining permission for a gas-cooker to be used at the cooking demonstrations to the children at the cookery centre in our town, under the auspices and control of the Devon County Education Committee. The advantage of this will be obvious, as by training the young to use a gas-cooker we are building-up our business for the future. We have also extended invitations to the schoolmasters to visit the gas-works with the pupils of the higher standards, for an "object" lesson. One headmaster has already availed himself of the offer; and I have reason to think that this will be worth something from the publicity point of view.

Again, when the mode of lighting the town is at issue, we have found that by reasonably meeting the Local Authority we have secured the public lighting contract for a further eight years, which comprises a scheme of high-pressure lighting for the public pleasure grounds of Ilfracombe. Obviously this has been advantageous to both the Gas Company and the Local Authority; and favourable comment has been passed by other than our own consumers, who have been diligent in their inquiries as to the precise details of the scheme. Seaside towns must necessarily be progressive, and anything that lends itself to the advertising and popularizing of such towns must be of considerable value.

Coke Disposal.

Much has been said and written lately regarding coke, the disposal of which has been, in the past half year, a very serious problem to most gas managers. The coke question in our case is at all times a troublesome one. During the past few months, however, it has been made more difficult by the stocks of our neighbours being large; and, as a consequence, they have been compelled to sell at lower prices, thereby closing some of our district markets.

Devon admittedly is one of the most sparsely populated of our counties, and lacks, moreover, the factories and other large coke consuming agencies which are so plentiful in the Northern and Midland counties. In Ilfracombe our make of gas, and consequently coke, is greatest during the summer months, when coke

is least desired, and heavy stocks accumulate. The disposal of such stocks becomes a matter of urgency, as storage is limited and costly. The winter demand being small adds to the difficulty; and I am sorry that these peculiar conditions make it compulsory for us to dump coke outside our district. I have endeavoured to overcome this in several ways, none of which have been the success I desired. During the past three or four months, however, in consequence of the great publicity given to coke and its disposal, we have inaugurated a system of "hawking," which has been fairly successful.

We arranged to give a local haulier a substantial discount on condition that he solicited from every householder, other than our usual coke consumers, orders for coke. This we have found will relieve our surplus of at least 300 tons per annum on the present basis of disposal. Our coke available for sale in 1913 was about 2600 tons; and our local sales were 1100 tons. So we had a surplus of 1500 tons. If any present have not tried this method, may I suggest they do so, because every additional ton sold in our own area reduces the quantity available for other districts, and assists in maintaining a better price all round.

Developing the Sale of Tar, Etc.

Mention was made in the February "Bulletin" of a campaign for developing the sale of tar. Personally speaking, I venture to question the advisability of the Association to deal with this section of our products. The extended use of tar on roads imposes an obligation on every gas engineer to press this on the local authority of his district, and to offer all assistance, technical and otherwise, which may be required by them. In our case, we have erected a dehydrating plant, which in its working and financial aspect has proved a success. If the undertaking contracts for delivery, I should advise the use of steel drums, as they are more economical. We have also been able to dispose of the light oils. The larger question of dehydration or distillation is hardly a subject for discussion this afternoon, and does not come within the province of my paper. Our sulphate of ammonia is sold by contract. Our neighbours, who make about 90 tons per annum, are able to fully supply local markets. As both are market towns, the farmers and market gardeners purchase from these towns when visiting; and, in order to get their orders, we should have to undercut.

Fixing and Hiring Fittings and Apparatus.

The extent to which each undertaking is prepared to go in the way of propagating its business, by free-fixing or hiring of fittings, cookers, fires, &c., must be decided by local circumstances. In our own case, we adopt the practice of fixing free all gas fires and cookers, and letting these appliances out on simple hire or hire-purchase terms; the fixing and hire of lamps, including maintenance, at low rentals; and giving free all labour for cleaning consumers' burners, fires, or cookers. In the case of new property, we always make the best terms we can with architects and builders, to secure their co-operation; and we do not allow the cost of the installation to stand in the way of having the houses fitted with pipes for gas.

Down to the present time we have not been successful in persuading all the members of the medical profession in our district as to the advantages and non-injurious effects of gas-fires. Some of them have such a dread of the presence of poisonous gases, which we know to be absent. I am not, however, without hope for the future.

Rebates to Consumers.

It will at once be conceded that we must do everything we can to increase the sale of our residual products, because the revenue derived from them has a very material bearing on the charge to be made for gas. As competition will be more severe than it has been in the past, gas must be sold at the lowest possible price. Personally, I am in favour of varying the price of gas according to the amount consumed. We have adopted this system, and allow rebates to the extent of 8d. per 1000 cubic feet.

Many undertakings meet with opposition from electric light companies, who offer to supply consumers with current at a fixed sum per annum, with a small charge for every unit used. This system of charging has appealed to many in our district. It has often occurred to me that we might formulate a scheme of charging a fixed price per annum, according to the number of appliances and lights used, and an extra charge of a few pence for every 1000 cubic feet consumed. It may in the future be worth consideration.

Does it Pay?

It may not be unnatural on the part of those concerned in similar sized undertakings as that of Ilfracombe to ask: Does it pay to introduce and practise these systems? My answer is most emphatically in the affirmative; and when I mention that during the past seven years, despite the fact that the resident population has not materially increased, the sale of gas has advanced from 44 million cubic feet to 58 millions, the maximum dividends have been paid, the price of gas has been reduced and discounts increased on three occasions (equivalent on last year's consumption to £1000), and capital charges have been reduced from 13·2d. to 10d. per 1000 cubic feet of gas sold, I venture to think you will agree that, at least in our case, it does. And I hope you will not think it egotistical of me to say that the Directors of the Ilfracombe Gas Company have been wise in their generation when they decided to adopt the "forward movement."

Mr. F. Templer Depree (Exeter), in proposing a vote of thanks to Mr. Armstrong for his excellent paper, said he was very pleased to hear that 77 per cent. of the gas undertakings were subscribers to the funds of the Association, because there had been a feeling that the gas companies had hardly risen to the occasion hitherto—especially from the point of view of their enormous capital in comparison with that of the manufacturers. It was a pity that some large undertakings had not yet seen fit to fall into line. Some made the excuse that they were municipal undertakings; but in view of the fact that Manchester and Glasgow were subscribers, there ought to be no great difficulty about places like Devonport coming in. Mr. Armstrong had referred to the difficulty of convincing doctors of the advantages of gas-fires. Perhaps this was because London had rather spoiled the doctors; for he had been asked by an Exeter doctor why things could not be managed there as in London, where he said they put in gas-fires for doctors for nothing. It might be worth while for companies in the western district to adopt this plan. In some places, cookers were put in free; and it might be desirable to extend the principle to fires where the doctors were concerned. He agreed with Mr. Armstrong that there were show-rooms in some towns which were not up to date, and might be made very much more attractive.

Mr. C. G. Dawson (Paignton) seconded the vote, which was carried, and briefly acknowledged by Mr. Armstrong.

Mr. P. S. Hoyte (Plymouth) remarked that the paper was valuable as a record of experiences, which varied according to the circumstances of different towns. They never found two gas-works alike; and in this matter of publicity the practice was not likely to be the same in one place as another. From the experience of others, they could, however, get ideas which might usefully be put into practice. With regard to the slot-meter business, there was no doubt that in some places the saturation point was nearly reached, and great things could not be expected in this direction. There were, however, other fields. In Plymouth, with 16,000 consumers, they had only 400 water-heaters in use; so that there was considerable hope of development in this direction. There was also to be won-back a good deal of business which had been lost to electricity undertakings. Complaint was made of dirty ceilings through the use of gas; but consumers failed to recognize that the heated currents of air which deposited dust and smoke on the ceiling destroyed germs, and that the whitening of a ceiling every five or six years was an advantage from the point of view of hygiene.

Mr. S. J. Ingram (Truro) said he was a firm believer in window-dressing, and in the necessity of following the gas to the point of consumption. In Truro, they recognized the advantages of advertising in the local newspapers and in programmes of bazaars, fêtes, and other events of the kind, as well as at cinematograph halls. The personal element also was of value in connection with advertising; and the staff had instructions to follow up any special advertising effort by personal inquiries. This had proved very valuable among the doctors, in whose houses gas-fires were fixed free as the result of co-operation between the Gas Company and the manufacturers of the fires. The effect of this had been that many scores of gas-fires had been placed in houses in Truro on the recommendation of the doctors. It had been found advantageous to work in co-operation with the local plumbers, who thus came to look upon them as friends, instead of as rivals. They also encouraged visits to the gas-works by parties of the elder children from the schools, who were thus not only interested in the manufacturing processes, but learned something of the advantages of the use of gas.

Mr. W. Nicholls (Penzance) referred to the benefits gained in the town by the opening of new show-rooms.

Mr. Goodenough agreed with Mr. Hoyte as to the advantage of promoting increased consumption by existing consumers. This was the most profitable of all business, for it did not need any increase of capital to bring it about. It was necessary to get all the new consumers they could; but to increase their business with the old consumers was certainly sound policy. Some undertakings had not realized the truth of Mr. Armstrong's remark that they were shopkeepers on a large scale, and considered it undignified to advertise. There was, however, an advantage in leading the public to see that they did not regard their business as a monopoly, but as a commercial house with something to sell. It was not the case that, as Mr. Depree's informant supposed, doctors in London were supplied with fires free of cost. They were in the first place fixed and maintained free; but if the doctors approved of them, they either rented them or paid for them outright. Maintenance was free in either case. The result of their policy had been a great increase in the number of fires in use by doctors and by institutions with which doctors were associated.

Mr. William M. Mason (the Secretary of the Association) said the question of whether it was necessary to advertise seemed no longer open; and the only point was how much advertising was necessary, and what profit could be made from it. It was not a thing from which they could expect results in a few minutes or a few weeks; but though it was the fashion to despise the day of small things, it was well to remember that the installation of a hundred gas-fires meant an increase in the sales of 1,000,000 cubic feet of gas per year.

After a few remarks by Mr. Rowe (Ilfracombe),

The Chairman closed the discussion by remarking that, in towns like Plymouth, where the Gas Company were working under a sliding-scale, the competition of the electric light was more

injurious to the consumers of gas than to the company. Electricity was the light of the well-to-do; and in so far as its competition prevented a reduction in the price of gas, it punished the poor who were consumers of gas. But for the competition of the municipal electricity undertaking, gas would now be sold in Plymouth at 1s. 6d., instead of 1s. 9d. per 1000 cubic feet.

Support of the Association.

On the motion of the Chairman, seconded by Mr. Stafford Ellery, it was unanimously resolved—"That this conference of representatives of gas undertakings in the South-Western District heartily approves of the aims, objects, and policy of the British Commercial Gas Association, is of opinion that it should receive the whole-hearted support of every gas undertaking in the district, and appeals to the administrators of the non-subscribing undertakings to join in this national movement for the advancement of the gas industry throughout the British Islands."

The conference closed with a vote of thanks to the Chairman, which was heartily carried, on the motion of Mr. Goodenough, seconded by Mr. Norton H. Humphrys.

Evening Lecture.

THE HYGIENIC VALUE OF COAL GAS.

In the evening, a lecture was delivered to a representative audience specially invited by the Chairman and Directors of the Plymouth and Stonehouse Gaslight and Coke Company. The lecturer was Professor Vivian B. Lewes, F.I.C., F.C.S., and his subject was "A Century of Work on Heating, Lighting, and Ventilation by Gas." Sir Joseph Bellamy presided.

Scotland can lay claim to having given the world many of the most useful and valuable assets of its prosperity, but few exceed in value the use of coal gas as an illuminant, the idea of the practical application of which was born in the brain of William Murdoch, when in the latter part of the Eighteenth Century he first made coal gas on a small scale at his father's mill at Lugar, in Ayrshire, and afterwards perfected his process while employed in Boulton and Watts' engineering works at Redruth, in Cornwall, and at Soho, near Birmingham.

A century ago coal gas overcame the prejudice against it that marked the first years of its inception; and in 1814 the first practical illustration of gas lighting was given by "The Chartered Gas Light and Coke Company" in London. Liverpool adopted it in 1816; Glasgow followed suit in 1817; and the conquest of Great Britain was completed by its installation in Dublin in 1818.

In tracing the wonderful development that has taken place in lighting during the century that has elapsed since Murdoch first burnt coal gas, and the wonder of his "flame without a wick" astonished the world, down to the present time when high-pressure incandescent lamps give a hundred times the light developed from a given volume of gas that was possible with the original burners, we find that the advances fall naturally into two periods.

The first was that in which light was emitted by incandescence of carbon particles generated within the flame by the decomposition of hydrocarbons in the gas, and which, starting with Murdoch's cockspur burners—which gave less than a candle unit of light for each cubic foot of gas consumed per hour—was increased gradually in efficiency by improvements in the burners used, until the regenerative burners employed in the last twenty years of the Nineteenth Century gave seven candles for the same consumption. The second period commenced with the discovery by Welsbach that, if the gas was burnt to a non-luminous flame in an atmospheric burner, the carbon particles could be replaced by others radiating a far higher degree of light, and so led to the discovery of the incandescent mantle, which, passing through many and various phases of improvement, now yields 60 candles of light per cubic foot of gas consumed in high-pressure burners.

The discovery that more than any other has led to advance was that of the atmospheric burner, due to Professor Bunsen, who, in fitting up his laboratories at Heidelberg, utilized a suggestion made by Sir Henry Roscoe, and devised the burner that now bears his name, and which not only made the incandescent mantle a possibility, but also led to the utilization of coal gas as a fuel.

As a fuel the strides made by gas are as great as for lighting. The gas-fire, the gas-cooker, and the gas-engine have practically levelled the load in gas manufacture, and in our congested cities have made possible industries that the crowded area would have rendered impracticable had coal-fired boilers and the steam-engine been a necessity for power production.

It is, however, in the region of hygiene that the great advances of the last decade have been made. The fact that gas lighting, by setting air in motion, promotes ventilation and prevents the stagnation of air that in a dwelling-room, shop, or factory is fatal to health, is now realized fully by the leaders of the medical profession, while the perfecting of the gas-fire, since it was made clear that radiant and not convected heat was the only healthful way of warming a room, has removed the last objection to coal gas as a domestic fuel, and the rapid advance of the gas-stove is certainly one of the most remarkable features in the progress of the industry.

The last thirty years of the Nineteenth Century were marked by the cumulative effect of smoke cutting down the needed vitalizing action of the sun to a minimum in our great cities, and causing such an increase in the number and density of fogs as to be not only a menace to health, but a national disgrace. The wide introduction of the gas-stove in London seems already to have improved this condition. One-sixth of the chimneys have ceased to add their quota of smoke to the atmosphere; and the registers show 84 more hours of sun than before, while the cleansing of the fog is a still more marked result.

Glancing at the marvellous progress of the past, it seems scarcely possible that the future can hold further advances to compare with them in magnitude; but I am much mistaken if we have more than touched the fringe of the possibilities that exist in the use of gas. The flat flame is to all intents and purposes dead as regards its use for lighting; and the fads of the few who decline to march with the times should not be allowed to stand in the way of progress. The next advance (and it will come very shortly) is the realizing that the standards of illumination power mean nothing, and that the calorific value of a gas supply means everything. With the abolition of parliamentary requirements as to candle power, and the substitution of a reasonable calorific standard, gas undertakings will be able to supply gas of uniform value at a fairly high pressure, and reduce the price—a step which, by still further popularizing the use of gas as a fuel, will add to the cleanliness and health of our homes, purify our town air, and last, but by no means least, economize our rapidly decreasing store of coal, upon which the supremacy of the Empire depends.

At the conclusion of the lecture,

Dr. Jaques said he had great pleasure in asking them to join with him in giving Professor Lewes a very hearty vote of thanks. When he came into the room he said to a friend connected with the Gas Company that he knew nothing about gas. "Well," he said, "you will before the evening is over." And he found it was a true prophecy.

Mr. T. Wolferstan said he knew everybody present would cordially second this vote. They had seen that gas was really one of the most useful articles of modern days. It suffered from a good deal of prejudice—almost everybody complained of the vapours in rooms caused by burning gas, and how deleterious this was to health. That evening they had had it thoroughly demonstrated that gas, so far from being deleterious to health, was one of the comforts they owed to science which saved a great deal of the trouble inseparable from coal-fires. He felt that all of them were thankful to Professor Lewes for explaining so lucidly the origin and the uses of gas.

Professor Lewes, in acknowledging the vote of thanks, said he hoped that on some future occasion his luck might bring him to Plymouth once more.

The Plymouth Gas Company afterwards entertained the company in the Palm Court of the hotel.

Water Gas Equilibrium in Hydrocarbon Flames.

This subject was dealt with in a recent communication to the Chemical Society by Mr. G. W. Andrew. The author has examined the equilibrium conditions as regards the reversible system $CO + OH_2 \rightleftarrows CO_2 + H_2$ in hydrocarbon flames by exploding, at varying initial pressures, homogeneous mixtures of such hydrocarbons as methane, ethane, and ethylene with quantities of oxygen insufficient for complete combustion, but sufficient to prevent any deposition of carbon on explosion (for example, $CH_4 + O_2$, $2CH_4 + 3O_2$, $2C_2H_6 + 3O_2$, $2C_2H_6 + 5O_2$, $C_2H_4 + 2O_2$, &c.). The results prove that, notwithstanding the very different maximum flame temperatures in the various experiments, the equilibrium ratios $\frac{CO + OH_2}{CO_2 + H_2}$ in the cooled products were nearly constant throughout the series, and practically identical with the value found by Professor Harold B. Dixon in his well-known experiments on the division of oxygen between carbonic oxide and hydrogen in flames, thus:

Mixture.	Mean "K." $= \frac{CO + OH_2}{CO_2 + H_2}$.
$CH_4 + O_2$	3·98
$2CH_4 + 3O_2$	3·98
$2C_2H_6 + 3O_2$	4·12
$2C_2H_6 + 5O_2$	3·63
$2C_2H_4 + 3O_2$	3·43
Mean	3·83

It would thus appear that the experimentally determined equilibrium constant "K" does not correspond with the maximum flame temperature, but with some lower temperature in the "cooling curve" when the gases cease to react rapidly. This temperature is identified as lying somewhere between 1500° and 1600°. It was further shown that so rapidly does the equilibrium in the system $CO + OH_2 \rightleftarrows CO_2 + H_2$ adjust itself to the falling temperature, during the cooling period down to that temperature, that even the deposition of carbon or the recurrence of considerable quantities of methane in the products has little or no influence on the equilibrium.

SOUTHERN DISTRICT ASSOCIATION OF GAS ENGINEERS & MANAGERS.

The Annual Meeting of the Association was held last Thursday, at the Hotel Cecil, Strand, W.C. There was quite a large attendance of members. During the transaction of the first items on the *agenda*, Mr. H. O. CARR, the retiring President, occupied the chair; having sitting at his right-hand side the President of the Institution, Mr. Edward Allen, of Liverpool.

THE MINUTES CONFIRMED.

The minutes of the autumn meeting were first of all confirmed on the motion of the PRESIDENT, seconded by Mr. W. E. PRICE (Hampton Wick).

REPORT OF THE COMMITTEE.

The annual report of the Committee was taken as read. It reviewed the proceedings of the year, and ended with the following information: "During the year, fourteen new members have been elected and two have resigned. With great regret, the Committee have to record the loss through death of Mr. C. E. Botley (Hastings), Mr. C. G. Grimwood (Sudbury), Mr. A. W. Onslow (Woolwich), and Mr. T. E. Pye (Chichester). The receipts for the year 1913 amounted to £123, and the expenditure to £114. The latter includes £44 8s. 6d., being the cost of the 'Reports of Gas Associations' sent to members. The balance in hand has risen from £80 to £89."

Moved by the PRESIDENT, and seconded by Mr. C. F. FRANKS, the report was unanimously adopted.

EDUCATION AND EXAMINATION OF GAS-FITTERS.

The HON. SECRETARY (Mr. H. C. Head, of Winchester) said he had next to present the report of the Sub-Committee on the Education of Gas-Fitters. The Committee was appointed in February last; and the first meeting was held that day. Mr. Thomas Glover, their new President, was in the chair. The report was as follows:

As members of the Southern District Association are aware, the education of gas-fitters has been receiving the attention of the Council of the Institution of Gas Engineers.

The matter originated with the Manchester District Association; and representatives of the Southern District Association attended meetings of representatives of Gas Associations and Trades Societies at Leeds. At these meetings, your representatives urged the education of gas-fitters, and deprecated the examination of gas-fitters, which latter would tend to place book work and the ability to answer questions before practical knowledge. The Institution of Gas Engineers took up the matter, and opened negotiations with Sir Philip Magnus, of the City and Guilds of London Institute, when the view (among others) of this Association was placed before him. It was found that, in order to obtain the assistance of the City and Guilds organization, an examination was unavoidable.

On Dec. 4 last, a letter headed "Examination for Gas-Fitters" was received from the Secretary of the Institution of Gas Engineers, and, as requested therein, your Committee appointed a District Examinations Committee composed of Messrs. Glover, Paterson, Doig Gibb, Westlake. Auchterlonie, and the Honorary Secretary, and sent a recommendation to the Council of the Institution of Gas Engineers: "That the Council of the Institution of Gas Engineers be asked to call a Conference of District Examinations Committees as soon as they shall have been appointed for the various districts."

An intimation has been received from the Secretary of the Institution that the recommendation has been adopted.

The instructions to the Examinations Committee were: "The first duty of the newly-appointed Committee to be the mapping-out of the district for Sub-Committees, and the making of a report to the members of the Association."

The appointment of local or sub-committees is receiving attention; and meanwhile the Examinations Committee present this preliminary report explaining the position at the present time, and invite the assistance of any members who have classes or other means of instruction for gas-fitters in their own undertakings or in the districts in which they are situated.

The Committee would again urge the importance of instruction rather than examination; and individual members are invited to inform the Hon. Secretary of the teaching arrangements in their respective towns.

Mr. THOMAS GLOVER (Norwich), the President-Elect, moved the adoption of the report. He said the Committee had had this matter under careful consideration; and the report was the result of this consideration. Before they got the matter into good working order, it would no doubt take a bit of knocking into shape; but they thought that, by conference with other Committees, and by the arrangements that would be made by-and-by, this question of the education of gas-fitters, and an examination which would be the culmination of each year's education, would be got into working order, and ultimately they would obtain a better class of gas-fitters than they had had previously.

Mr. W. G. HEAD (South Metropolitan Gas Company) seconded the motion.

Mr. JAMES PATERSON (Cheltenham) said he should like to make a few remarks on this important report, seeing that it dealt with a matter which he had very deeply at heart. He had the honour—some three years ago now—of being appointed one of the Association's delegates to go to Leeds in connection with the question of the education of gas-fitters; and their present Hon. Secretary (Mr. Head), Mr. Price, and himself gave to the question a great deal of close consideration throughout the course of the work done in bringing the scheme to fruition. What he particularly wished to say was that they had taken up rather a unique standpoint, so far as the rest of the country was concerned, with regard to this scheme, by trying to emphasize the relative unimportance of examinations, and the absolute importance of education. The scheme, they knew, was for the education of gas-fitters; but one or two of them had felt there had been rather undue importance placed upon the word examinations. They felt that the Institution, in going to the City and Guilds of London Institute, had somewhat tackled the end of the scheme instead of the beginning. His own feeling had been that insufficient emphasis had been placed upon preliminary education, which was absolutely indispensable to the men. He was speaking now without any reference to the question of the examination generally of gas-fitters, because, when the scheme was adopted by the Institution, his own personal views were not those of the majority. The Sub-Committee, in considering this matter, had carefully discussed the question of education, apart altogether from any examination; and they did feel that there were ways opening out whereby, in future, this scheme could be placed upon a thoroughly satisfactory and permanent basis.

The report was unanimously adopted.

AN ILLUMINATED ADDRESS FOR MR. PRICE.

The PRESIDENT said that, among the last duties of his year of office, was one of a very pleasant character. It would be remembered that, at the autumn meeting, a resolution was passed in which Mr. Price figured very largely; and it was thought that it would be a very nice tribute to their friend if the resolution was illuminated on vellum. The Committee had therefore had this done; and it made a handsome work of art. In the name of the Association, he would ask Mr. Price to accept it as a reminder of the great gratitude of the members to him for the arduous work that he undertook for the welfare of the organization between the years 1910 and 1913, or for four years. He (the President) understood there was still a little corner left in Mr. Price's house in which the testimonial might hang; and he hoped that their friend would be—he was sure he would be—very proud of it. He was also certain that it would be one of the things he would not be too modest to show his friends; and on occasion, they might see him standing in front of the testimonial in reverent admiration. [Laughter.] He had great pleasure in handing the testimonial to Mr. Price. [Cheers.]

The testimonial (which is framed) reads:

> "The following resolution was submitted and carried unanimously at the autumn meeting (1913), of the Southern District Association of Gas Engineers and Managers:
>
> "The Southern District Association of Gas Engineers and Managers wish to place on record their high appreciation of the valuable services rendered by Mr. W. E. Price to the Association as Honorary Secretary from 1910 to 1913, and to thank him for the businesslike way, geniality, and tact with which he has carried out the affairs of the Association during that period. Furthermore, to wish him every success in the new position offered to and accepted by him, of Honorary Secretary to the Institution of Gas Engineers."
>
> H. O. CARR, *President.*

Mr. PRICE (who was received with much applause) said he did not know how to put words together to express his feelings. He could only say one thing about the presentation, that the members had done far more than he deserved. The members had made a mistake, which might be to his (Mr. Price's) advantage. Anyway he did very much appreciate the testimonial in the spirit in which it was given. When he read the fine piece of composition, he knew that the members meant well in doing it; but they need not have gone quite so far. He was, in fact, doubtful whether it was altogether truthful. [Laughter.] When he looked at the work of art, it would serve to remind him of the four years of very delightful work he had done for the Association. Until one had filled the position, one did not realize the pleasure that it was to be the Hon. Secretary of the Association. The testimonial would remind him of these years, of the work he had done, and of the very good set of fellows with whom it had brought him in contact. It had not been work; it had been pleasure. Sometimes, it was true, one had to do the work late at night, because one suddenly remembered that next day was the day of the meeting. He was sure the new Hon. Secretary would do nothing negligent of this sort, but would always have everything ready when called for. He (Mr. Price) had had the pleasure of sitting alongside four Presidents; and if he had been of any little assistance to them, the pleasure had been his. Without the testimonial, for the sake of the pleasure and the good fellowship the office had brought to him, he would have done the work, and would do it over again if he had the same opportunity. He was only sorry he had to give up the office. But he felt he could not hold two such offices. It would not have been fair to others or to himself. They fortunately saw one standing by ready to take up the reins, and one who they all felt would make an ideal Hon. Secretary; and they had him in Mr. Head. He had to thank the President and the members for their great kindness to him; but they now shared with him the pride he felt that he was leaving the office only to take up a similar one in connection with the Institu-

tion, in which position he hoped to have the support of all his colleagues in the gas profession. [Cheers.]

DISTRICT REPRESENTATION ON THE INSTITUTION COUNCIL.

On the motion of Mr. PRICE, seconded by the PRESIDENT, Mr. Thomas Glover, President-Elect, was appointed District Representative on the Council of the Institution of Gas Engineers.

MR. GLOVER TAKES THE CHAIR.

The PRESIDENT said his final duty in the chair was the induction of their new President, Mr. Thomas Glover, of Norwich. One got dethroned, and a new sovereign was set upon the inconstant throne. Mr. Glover needed no introduction. He came from a large city; and he was responsible for a large gas undertaking. Norwich was a city that always had one cathedral, and sometimes a flood. They all knew how very successfully Mr. Glover evaded any evil consequences, so far as light, heat, and power were concerned, that the last flood might have brought to the citizens. They looked forward on this occasion to having a flood of matter of great value in his address. He now asked Mr. Glover to take the presidential chair; and he most heartily congratulated him, and wished him an abundant success during the year.

Mr. Glover, amid applause, took the chair.

THANKS TO MR. CARR.

The PRESIDENT thanked the members; and then said his first duty in the chair was a pleasant one. It was to propose a vote of thanks to his predecessor (who had so graciously inducted him to the chair) for the services he had rendered to the Association during the past year. They all knew they would have a good time when Mr. Carr came to the chair. They had looked upon him for many years, had respected him, and held him in great regard. This regard had not diminished one iota, but rather had been greatly increased by the services he had rendered to the Association. He hoped Mr. Carr would look back upon his year of office with unmixed feelings of pleasure and pride in having helped the Association in the way he had done.

Mr. PATERSON, in seconding, remarked that Mr. Carr said, at the beginning of his year of office, that he would do the best he could for the Association, and he had done it.

The motion was cordially adopted.

Mr. CARR said he had to thank the President and Mr. Paterson for the very kind words they had said concerning him. It was, as Mr. Glover had remarked, with very great pride that he should look back to his year in the chair, and should ever remember the kindness the members had shown him. He had, however, the sense of not having fulfilled the duties as he should have liked. But, as the members would understand, his time had been very much occupied during the year owing to the amalgamations in which his Company had been concerned. In thanking the members generally, he should also like to thank the Committee more particularly for the support they had rendered him.

NEW MEMBERS.

On the motion of the PRESIDENT, seconded by Mr. C. F. BOTLEY (Hastings), the following gentlemen were elected members of the Association: Mr. J. J. Coe, of Arundel; Dr. Rudolf Lessing, of London; Mr. C. V. Bennett, of Rochester; Mr. N. G. Lemmon, of Horsham; Mr. T. N. Ritson, of Chichester; Mr. Walter H. Price, of Reigate; and Mr. Samuel Glover, of St. Helens.

The PRESIDENT then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—Let me first of all express my thanks to you for the confidence you have shown in electing me your President for the coming year. I wish to assure you that I appreciate the honour, and will endeavour to sustain the best traditions of the Association.

The duty of preparing an address for the opening of the new session is rendered none the easier by having had a similar task on two previous occasions. However fertile a man's mind may be at certain stages of his career, it is not safe to assume that the springs of suggestion have a source of perennial freshness, or that his power of assembling facts in an interesting manner will not fail under the pressure of doing to the best of his ability the daily round and the common task in the place where his lot is cast. It was the sage of Chelsea who said "Our grand business is not to see what lies dimly at a distance, but to do what lies clearly at hand;" and those responsible for the conduct of gas undertakings are not likely to indulge too much in dreams. Our national characteristic as regards the industries is said to be practicalness—the power to solve a problem not by philosophical reasoning, but by natural instinct and by experiment.

The British gas industry can justly claim to have led the way in doing that which is clearly at hand in adapting the business of gas supply to domestic fuel requirements and to the needs of industry. But while we are thus practically engaged, we shall not retard our work, but shall probably gather inspiration for greater effort, if we occasionally lift our eyes from the work, and indulge in visions of further future victories to be won for all that the gas industry, in its modern phases, stands for in the urban life of the British people. For although our interests are not confined to town and city life, our greatest sphere of usefulness in the future, as in the past, must be to the communities gathered in more or less compact areas; and to these the local gas undertaking ought to stand for a great deal. A glance through the order book of a gas company's outdoor department and a morning spent at the manager's table would be a revelation to an outsider as to the number and variety of ways in which a gas company comes in contact with the public, and always in the way of rendering useful service. If this were a popular lecture and not an address to technical experts, one might indulge in picturing the points of contact between the gas company and a supposed visitor to the works. At some risk of appearing to deal with the question in too simple a fashion, I mention a few, because, personally, I like to think of them, and am glad to have been called to help in providing some of the necessities of our civilized life, and also some of its comforts.

GAS IN THE HOME AND INDUSTRIES.

The supposed visitor then at this time of the year having enjoyed his warm bath, supplied by the never failing gas water-heater, and having comfortably dressed by the gas-fire, steps down to a breakfast where the coffee was roasted, the rasher cooked, and the bread baked by the hot smokeless gas-flame. Even the beet sugar for the coffee and the grain for producing the bread were improved by the influence of a gas-works product. The starch used for the table linen was dried during manufacture by the use of coke, and the patent medicines and photographic materials used in the house were based on tar products. The visitor steps from his door on to a tarred pavement, and admires the improvement made in the carriage way by the substitution of a bituminous binder (a product of tar) in place of an unsatisfactory water and marl bound road.

Having spent an interesting hour or so at the gas-works, and admired all the latest mechanical appliances and scientific instruments to ensure low costs, precision, and accuracy, we will now imagine our visitor spending the rest of the day inspecting other industries. He steps into the printing office to see the daily paper produced, and finds the matrix being dried and the metal in the foundry and at the linotype machines being melted by means of gas; the machinery at the boot factory driven by gas-engines, and the tools heated by gas. At the laundry and clothing factory, the irons are heated by high-pressure gas-flames. The cutler is tempering his steel, the maltster is roasting his malt, by the same fuel. And so on throughout the trades the cheap, clean, and convenient gas-flame is in use. Before leaving the boot factory, the visitor might witness the factory lighted in the most perfect manner by high-pressure incandescent mantle burners; and if he looked into the homes of the operators, he would find them beautifully lighted by gas, and the food being cooked in gas-stoves. This is no more than an outline of a reality which may be varied and filled in according to the geographical position and local circumstances of the town served. But it indicates an almost perfect state of things from the gas administrator's point of view—*i.e.*, an almost general use of gas for domestic and industrial fuel purposes, and at the same time a fair share of the lighting business. The outline given was described as a reality—sufficient has been achieved to make this claim. It is a statement, however, which needs some qualifying—the picture drawn is only partially true. Moreover, our claim to supply the services indicated is disputed by competitors in every direction. But the extent of the qualifications is the measure of our hope for the future; and the more our claim is disputed, the more strenuously shall we strive to improve our services and so win the approval of the public.

GAS FOR FUEL.

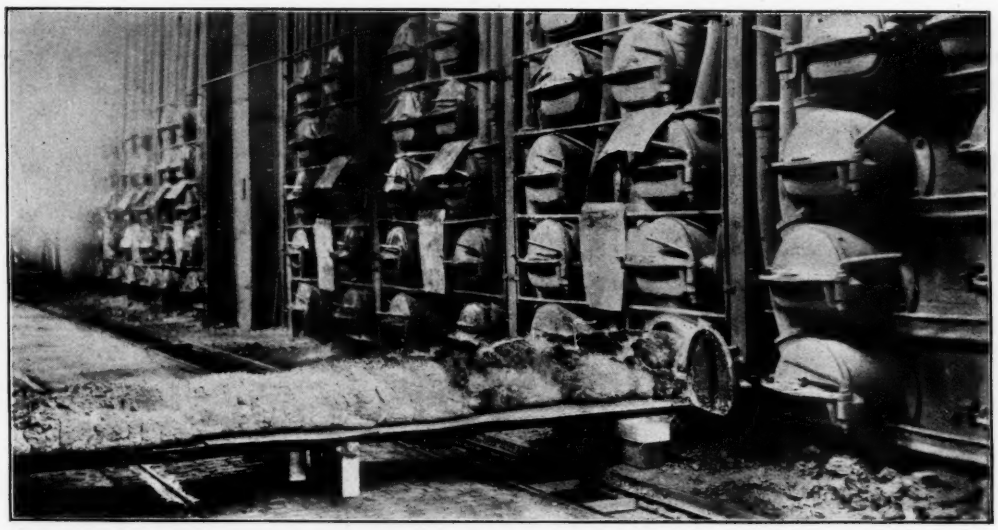
Now for our primary product—gas. We are all conscious that, if it is to become popular for fuel purposes, the price per 1000 cubic feet must be brought down to a low figure. A great deal can be done, even where the price is comparatively high, by the use of well-adapted publicity methods and modern salesmanship. But an undertaking in a position to sell gas at (say) 1s. 6d. to 2s. 6d. per 1000 cubic feet will give its outdoor staff an easy task compared with a less fortunate neighbour compelled to charge a much higher figure. There are some disadvantageous circumstances militating against the selling of gas at a low price that are difficult, in some instances, to overcome—such as high railway rates on coal, or legacies of heavy capital charges. But whether we are fortunately or unfortunately placed in these respects, we are all affected by the value we can obtain for products other than gas; and at the present time these call for more than usual attention.

THE QUESTION OF COKE.

First in importance, and demanding attention for several reasons, is coke—too often, it is to be feared, treated as a "residual" and not as a valuable product. From Professor Lewes's recently published book on the "Carbonization of Coal" the following extract is taken:

> If only the companies would live up to their title of "gas light and coke companies," and bestow as much care on the coke as on the gas, and cater for the supply of a good domestic fuel at the price of coal, instead of treating coke as a bye-product, the demand for it would soon reach a point that would enable the desired reductions in the price of gas to be made.

This is a statement demanding attention at a time when the presence of huge stocks is having a depressing effect on prices, and the outlook for coke has been altogether of a gloomy character. The following questions suggest themselves as worth



SAMPLE CHARGE OF COKE FROM 18-INCH BY 24-INCH RETORTS AT NORWICH.

trying to answer: Are we making a product for which there is no adequate and healthy demand? If so, can we improve the quality and stimulate the demand? Can we regulate the make to correspond more closely to the demand?

In reviewing the position, there are a number of factors to be considered if we are to get anything like a grip of the question for future guidance. First, there is the comparatively large make during the season of least coke consumption, due to the greatly increased use of gas for cooking in summer. This, though no new experience, is growing, and was exaggerated in 1913 by an exceedingly mild autumn lasting until close upon Christmas. Usually under such circumstances, and with gas oil at normal prices, the production of coke for sale would have been reduced in many works by increasing the proportion of water gas. Unfortunately the price of oil rendered the production of carburetted water gas in the ordinary way very unprofitable, and many plants were shut-down. This, I venture to suggest, was unnecessary; and I may be permitted to give you my reasons at a later stage. The point to be remembered now is that the shutting-down of water-gas plants was responsible for increasing the quantity of coke available for sale.

In the Southern Counties, particularly in the neighbourhood of London, it is understood that two other contributing causes to large stocks were the falling off in the demand for coke in the cement trade, due to the increasing use of kilns fired with other fuel, and the competition of anthracite for forcing fruit. In the Midlands and in the North, the recovery ovens at the collieries are placing on the market a large quantity of coke, some of which comes into competition with that produced at gas-works, particularly when there is a falling off in the demand for recovery oven coke for the metal industries.

These are unfortunate facts which need facing; and we have to confess that ordinary gas coke does not grow much in public favour as a domestic fuel. The outlook as regards maintaining good prices for this important product is not very cheerful; but I believe it is capable of being made better. One of the remedies is to improve the quality, and to arrange to keep it, as far as possible, constant as regards moisture and ash content. Coke is the worst possible form of fuel to stock in the open, exposed to the weather. Care may be, and ought to be, taken in manufacture to restrict the quantity of water used for quenching. The fuel used not only has to evaporate absorbed water, but loses heat units as latent heat in the steam produced.

PROTECTING COKE STOCKS FROM WET.

If we wish to realize what this means, imagine having to keep up retort temperature from stock coke we have seen after a spell of wet weather, and we shall not need to ask why gas coke is not always the popular fuel we would like it to be. This leads me to say that, as a result of some experiments conducted in the laboratory of the Norwich Gas-Works, it is found that saturation takes place much more readily when the coke is overquenched than by exposure for a short time to rain after it is cold. The reason for this was given (when discussing the gravity of coke from furnace ashes) in a paper recently presented to this Association by Mr. Harold Woodall. The experiments show that a piece of red-hot coke will absorb 46·81 per cent. of its own weight of water in 1½ minutes; while a piece of cold coke absorbs only 17·64 per cent. in the same time.

Wherever possible a roof over the coke yard and hoppers should be provided; and the stock—which should be kept within the bounds of that only which is required for seasonal compensation—should also be put under cover. This may seem a somewhat large order; but in these days of steel or ferro-concrete stanchions and light roofs, there is nothing unreasonable in the proposition. Consider, too, what it means in the improvement of the coke from the point of view of reliable moisture content!

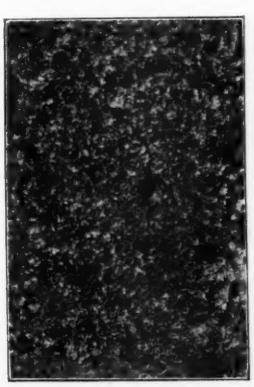
The cost of the roof over the coke yard at Norwich was as follows:—

Stanchions—	
Extended portion above hoppers and steelwork for strengthening, including one additional hopper .	£296
Roof and covering.	160
	£456

Ground space covered, 4053 square feet.

QUALITIES AND USES OF COKE.

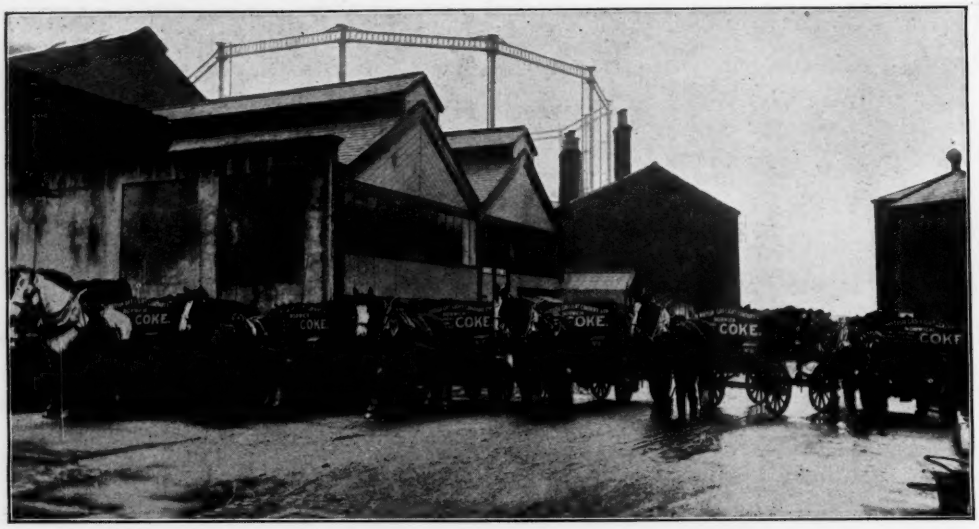
A coke-salesman was recently asked by someone who was interested in the subject what percentage of ash his coke contained. He at once answered, in the manner of a commercial man, "Oh, about 3 per cent." Now when we have something to sell, it is well to know all there is to know of its quality and capabilities; and it is desirable, for the sake of maintaining the general character of coke as a fuel, that we should adopt for ourselves a standard as to the percentage of ash, and endeavour, in choosing our coals, to select such as will not produce coke containing a higher percentage than the standard adopted. At this juncture, I conceive it to be a duty devolving on each gas undertaking to raise if possible, and to maintain, the standard quality of coke produced, otherwise it is to be feared the competition of anthracite and other fuel will be increasingly felt, particularly as fuel-users



A Section of Norwich 12-Hour Coke, showing its Texture.

A. Coke-Ovens Stamped	B. Coke-Ovens. Unstamped	C—Not Disintegrated Gas-Works Not Stamped

[Reproduced from Mr. J. E. Christopher's Manchester University Lecture—see "JOURNAL," Jan. 13, 1914.]



COKE DELIVERY AT NORWICH BY HORSE WAGGON.

are much better informed in these days on the question of fuel values than was formerly the case.

It is pleasing to record that there are promising signs of coke produced in gas-works coming into use again for malting purposes. Mr. Watson, of Doncaster, has placed it on record that something like 250,000 tons of gas coke were at one time used for this purpose. Owing, however, to the arsenic scare about twelve or thirteen years ago, the use of gas coke was entirely forbidden by the buyers of malt. I have had samples of coke submitted to our County Analyst on several occasions; and he reports that there is no appreciable trace of volatile arsenic present. This, together with the better quality of coke now produced, has induced a leading firm of maltsters to send us repeat orders; and we are exercising all possible care to supply a quality to which no objections can be raised, either from the point of view of arsenic content or of objectionable volatile matter which might discolour the malt. I hope this experience at Norwich may give encouragement to those who are endeavouring to recover this particular market for coke.

I should like to add another phase of the use of coke in fruit-growing. I drew attention to it in my presidential address to the Institution of Gas Engineers. The Norwich chamber ovens were the outcome of the requirement of denser coke for this fruit-growing. But we have found that we can produce the same quality of coke by filling up the Ω-retorts, 22 in. by 16 in., and the other section with which we experimented. We can produce the same features in the coke—compactness, size, and greyness. The leading fruit growers who had been the first to introduce furnace coke for this purpose, because they found they could keep their fires in better with it than with the ordinary gas coke, came back to us. In one case, this means about 1000 tons a year; and in another instance, about the same amount. These two growers recommended furnace coke to all their friends; but those who were the first to advocate the change were the first to come back.

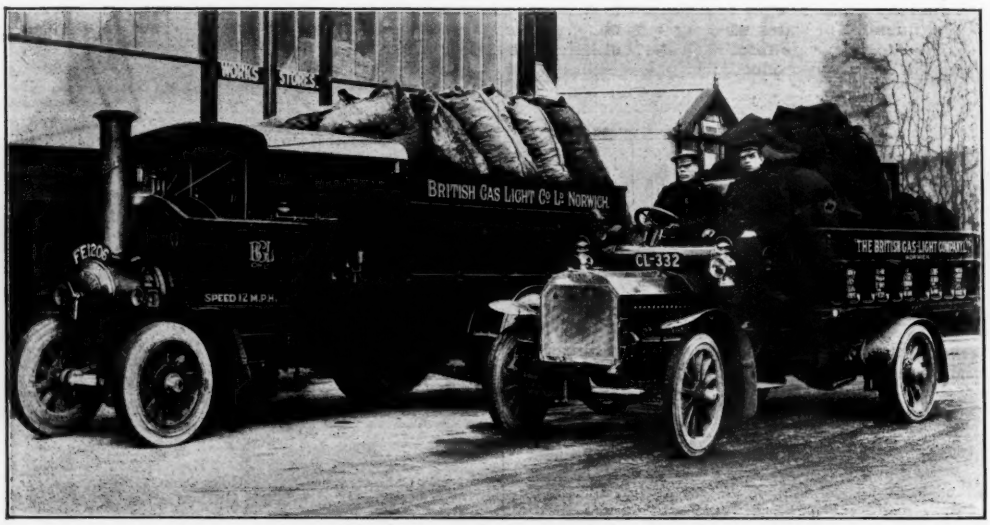
Fortunately, in those works where heavy charging is now practised, the coke is massive and grey, and is altogether a better looking fuel than that obtained from light charges. Breaking and sizing, together with convenient methods of delivery to customers, stimulate the demand, and have enabled better prices to be obtained in many towns. Where continuously worked vertical retorts are in use, coke is produced which is absolutely dry; and if care is afterwards taken to prevent its becoming saturated, the dry condition of the coke ought to be regarded as no little advantage in favour of this mode of carbonizing.

It is to be hoped that, by taking care to produce a good article, suited, as to quality and method of delivery, to the local requirements of the district in which each works is situated, the price may be maintained at a satisfactory figure, as this has an important bearing on the manufacturing cost and ultimate selling price of gas. This will be the more readily accomplished if the production of coke is regulated to the anticipated demand by the greater or less use of the water-gas process, carburetted more or less according to circumstances.

WATER GAS MANUFACTURE.

At the Norwich Gas-Works the water-gas plant is in action all the year round; but the percentage added to the coal gas, and the amount of enrichment, are varied according to the season and having regard to the price of oil and the coke stocks. With a reasonable amount of care, the quality of the gas can be kept constant. The photometric value of the coal gas, tested with the No. 2 "Metropolitan" burner, even when making 12,000 to 12,500 cubic feet to the ton, is always higher than the required standard. Water gas is, therefore, used as an illuminating diluent. The flame temperature of the mixture, however, is higher than that of coal gas; and a gross calorific value of about 570 B.Th.U. is maintained. When the percentage of water gas to be added does not exceed 18, the gas is unenriched by oil gas; but with higher percentages the enrichment is increased to correspond with the percentage added. The higher the percentage, the greater the proportion of oil gas used.

The working of the water-gas plant to give good results under these varying conditions may be deemed worthy of consideration. The first essential to efficient working when only carburetting



MOTOR VANS FOR COKE DELIVERY AT NORWICH.

MACGROUT ROAD—SCARIFYING IN PREPARATION FOR LAYING DRY STONE.

with oil to a small extent, or not at all, is a powerful blast. By "powerful blast" I mean a blast pressure much more powerful than that which we used to deem necessary when using 3 gallons of oil per 1000 cubic feet. The blast we now use is about 20 inches; and it is obtained from a powerful turbine blower. I am strongly of the belief that a positive blower would suit the purpose even better, so as to get the same quantity of air coming through the fuel bed in all conditions. The second important condition is to graduate the depth of the fuel bed in accordance with the percentage of carbon monoxide required in the blast gases to keep the brickwork in the carburetter and superheater to the temperature corresponding to the quantity of oil to be gasified.

When making blue gas only, a fuel bed of 5 feet, and a blast-pressure under the grate of not less than 20 inches, will reduce the CO in the blast gases to a low percentage (about 4 per cent.), and the fuel in the generator will be raised to a high state of incandescence owing to the burning of the carbon almost completely to CO_2. This is done with a blast period of $1\frac{1}{2}$ minutes and gas making for 6 minutes' duration.

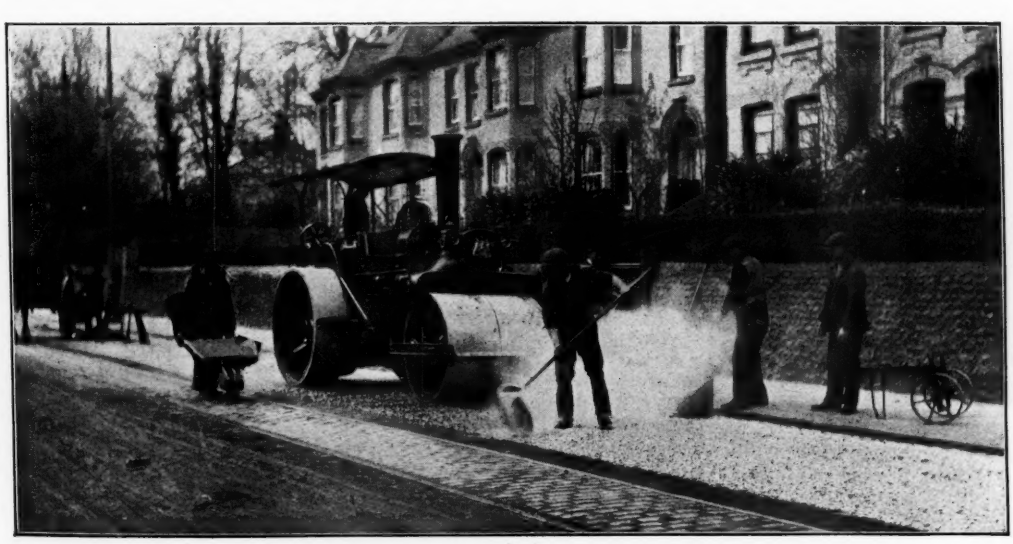
When carburetting to the extent of (say) 1 gallon per 1000 cubic feet, the depth of the fuel bed is increased to 7 feet, and the blast period made 2 minutes to 6 minutes' gas-making, and so on. The coke consumption when making blue gas is for the generator 30 lbs. per 1000 cubic feet, and for the boilers 23 lbs. of fine breeze. The plant can thus be worked economically whether carburetting with oil is being done or not; and it may be regarded as a most valuable adjunct for reducing the cost of gas into the holder both directly and also indirectly, as by its use there is less danger of accumulating surplus stocks of coke, to be sold at prices which are the reverse of beneficial not only to the individual works, but to other undertakings over an area wider than is generally supposed.

This is a method of regulating the production to avoid unduly large stocks which is quite familiar, and its value is not likely to be underestimated. What I have said, however, as to the use of the plant when oil is dear will, I hope, encourage those who have shut-down to experiment on the lines suggested. The over-production of ordinary gas-coke will be further regulated and restricted if the large gas-works in the industrial parts of the country will follow the lead of Birmingham, and compete with the collieries in producing a proportion of metallurgical coke. In doing so they will check, at the same time, the increasing production at the collieries of tar products and sulphate of ammonia. The effect of this increasing production, so far as tar is concerned, has been more than neutralized up to the present time by the demand for road purposes; but the value of ammonia products is suffering, as might naturally be expected, by the constantly increasing quantity recovered from coke-oven gas.

TAR AND THE TREATMENT OF ROADS.

The place that tar and bituminous binders will take for road surfacing and road crust construction are subjects, in my opinion, worth closely following; and a sympathetic spirit of co-operation should exist between the producers of tar and tar products and the engineers who are responsible for the making and maintenance of our roads. I would like to express a word of congratulation to Mr. H. P. Maybury (at one time closely identified with our industry) upon his appointment as Chief Engineer to the Road Board. We may be quite sure that, in view of the splendid work done on his initiative with tar products in Kent, the use of the right quality of bituminous matter originating in gas-works will receive favourable consideration; and this will exercise a beneficial check on the exploitation, to an undue extent, of natural bitumen.

While the surface treatment of water-bound roads for the prevention of dust, and the reduction of wear of road surfaces by attrition, is now out of the experimental stage, and the advantages of the process are well known and acknowledged, much remains to be done to ensure uniformly good results being obtained. Gas engineers, and particularly those who are also tar distillers, can be of much assistance to the road authorities in this matter; and while the final tribunal must be actual experience on the



MACGROUT ROADS—GROUTING AND FIRST ROLLING.

MACGROUT ROADS—LAYING AND ROLLING DRY STONE ON SCARIFIED SURFACE FOR THREE-INCH FINISHED THICKNESS.

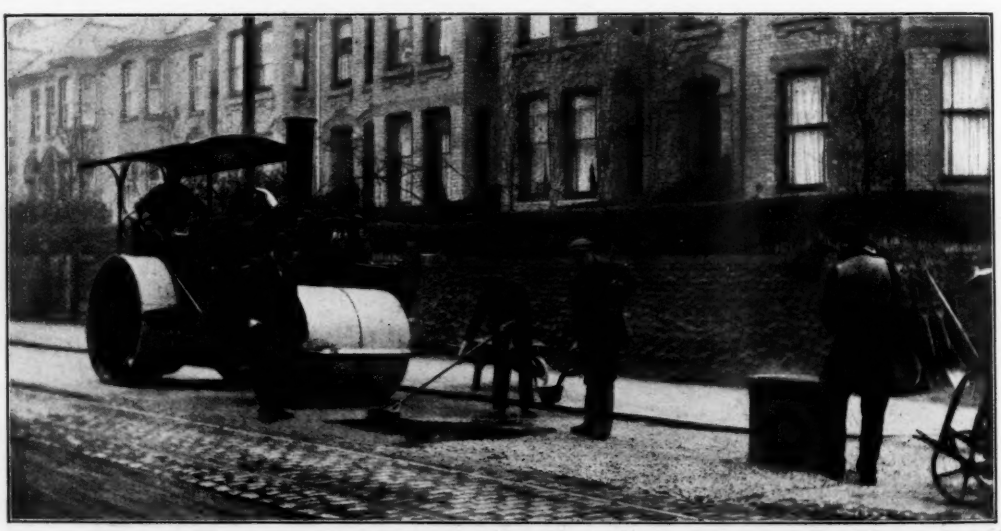
roads, the gas engineer and his staff are better equipped for the experimental work and standardizing of the bituminous preparation than the road surveyor. The best results can only be obtained by the co-operation of those supplying with those using these materials.

The specifications framed by the Road Board have been of some assistance. Gas-works tar, however, differs so much in its properties and characteristics with every variation in the class of coal carbonized, and particularly the method of carbonization adopted, that it becomes necessary, in the interest of uniform results, that the tar from every works be separately studied. In the case of heavy-charge tar and vertical-retort tar, the material is usually readily rendered suitable for road surfacing by removing the lighter portions of the tar by distillation. Certain tar, however, as made at high temperatures from small horizontal charge work, is of such a nature that the removal of its lighter constituents is not sufficient to bring it into conformity with the Road Board specification. This, it would appear, can only be done by synthetically blending the pitch from such a tar with heavy oils (practically free from naphthalene) in the required proportions—a process usually too expensive to be admissible. Adherence to the Road Board specification would appear to mean the exclusion of many such tars, so reducing the source of supplies, with a consequent rise in prices—a feature undesirable in the interest of extension of the use of tar for such purposes. It has no doubt been observed that heavy viscous tar requires more and larger shingle or chippings; but a much more durable coating is obtained by its use. It has been estimated that the saving in tyres to motorists on a tar surfaced main road from London is equal to £2000 per mile per annum. The cost of tar surfacing such a road would be about £70 per mile.

Viscosity and specific gravity are not qualities which follow on parallel lines; and of the two it is desirable to have a test for, and to adhere to, a standard of viscosity. The purer the tar the more difficult it is to get the specific gravity of the Road Board specification without getting a viscosity which the county engineer or his contractor finds inconvenient in application. The preparation of an ideal road dressing involves the exclusion of water-gas tar, the removal of water, naphtha, and light oils. The naphthalene content should be as low as possible, and the free carbon should not exceed 16 per cent. The nearer the material approaches a mixture of pitch of low free carbon content and anthracene oil, the better the results are likely to be. Such a tar when applied to the roads is not readily soluble in water, and during wet weather it does not discolour drainage water, and will therefore not pollute streams. Properly prepared tar does not cause the death of fish. The surface treatment of existing macadam roads must continue for some years to come. At best, however, it is only a thin veneer; and there is little doubt that the substitution of bituminous bound for water bound roads will extend as existing roads are reconstructed, particularly in the towns and their environs.

While the required properties for a bituminous binder for road construction are few, they are, nevertheless, exacting. The temperature of a road surface may vary between 26° Fahr. in the winter and 120° Fahr. in the summer; and the binder must stand this range of temperature without becoming brittle at the lower, or unduly softening at the higher, temperature. The problem appears to centre for the most part around the relative resistance of these bituminous binders to this range of temperature. The material must remain resilient at the lower temperature, and not soften too much under the summer sun, nor perish by the evaporation or oxidation of its constituent oils, after long wear and exposure.

Natural bitumen has proved an almost ideal material for the purpose; but the limited supply and high price prevent its extensive use except for first-class roads. The provision of a substitute presents, therefore, an attractive market for the bituminous product of gas-works. Various pitch grouts, consisting of soft pitch loaded with sand and other materials, have been tried with varying degrees of success. Along with others workers in this line of investigation and experiment, I have been to some trouble to



MACGROUT ROADS—TOP DRESSING WITH GROUT AND SHINGLE. AFTER FINAL ROLLING, THE ROAD IS FINISHED.

devise such an article as will answer the requirements, and am looking forward with reasonable expectation to disposing of the whole of the Norwich production of pitch in this way.

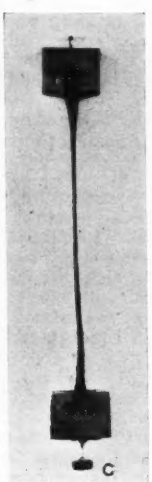
AN EXTEMPORE INTERPOLATION.

Here the President, leaving the prepared address, called attention to a section of macgrout road crust. He said this form of road surfacing paid; the tar treatment of roads being only a thin veneer. Under most circumstances, the tar sprayed or brushed on the surfaces required renewing once a year, to the great inconvenience of the travelling public. It was possible, though, with some classes of road—if the tar was of the right quality and by suitable treatment—to build up an asphalte surface which would be practically as good as the best natural asphalte surface. This [holding up the section] was a piece cut from a road with which he (the President) was well acquainted. It was originally just rough flint stones—sand and unbroken stones, and broken stones and shingle. It was a very dusty road indeed in summer, and a muddy one in winter. The piece of road from which the sample of road-crust was quite recently taken was done at his Company's own expense to prove what could be accomplished; and they had managed to build up, at little expense, a crust such as the members saw before them. It had taken about five years to build up the crust to the thickness shown, by annual painting. The first year it was treated twice—once in the spring, and once in the early autumn. This gave it a good start, because the surface never really wore off. There was sufficient asphalte built up the first year to give them a good foundation. But on main roads, with ordinary tar work, they had to begin *de novo* practically every year—the whole of the tar being dissolved and worked off in the wet months of the winter. Then they had the bare macadam again, which suffered so much in the winter. [The President showed another piece of crust.] Here, he said, they had quite another story. This section was cut out of a piece of road laid in the presence of the Eastern Counties Commercial Section in May last. It had been grouted with the new material, in the preparation of which he (the President) had taken a great deal of interest. The members could see that the sample was resilient, and had tremendous clinging power. The section had been cut out at some trouble, because the stuff was very tough and hard—indeed, with a good steel chisel and hammer, it took a man some hours to cut it out. There was the water-bound bottom of the road on which it was laid. On the wearing surface, there was not a stone to be seen, because the grouting material was just soft enough to work to the top. This had been subjected to motor and horse traffic in and out of the gas-works; and the traffic had been passing over it for the last ten or eleven months. From the experience gained, he believed it would last between twenty and thirty years. In connection with this matter, the Company proposed to supply the tar hot to the Corporation, with whom in this matter they were working hand in hand. The Company were in fact opening up quite a reputation in the city for working with the Corporation in providing good roads.

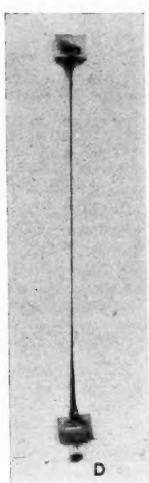
The address in its different parts was copiously illustrated by lantern slides; and here the President threw upon the screen a drawing showing the ductility and toughness tests to which a section of the macgrout had been subjected. This drawing is reproduced. Among other remarks, the President said that coal tar pitch was a somewhat different material. It broke very readily. Soft pitch and sand made an excellent grouting; but the pitch not being incorporated sufficiently closely with the filler, retained the qualities of pitch, and under the heat of the summer sun separated out, to the discomfort of those who used the road. Moreover, the pitch and sand made a non-resilient concrete; while the macgrout—being made of a pure pitch of the paraffinoid type, and being closely incorporated with a fine filler—never separated under summer temperatures; and although it softened to some extent did not adhere to the wheels of vehicles or to the feet of animals. From the sample they would see that it could be twisted and drawn out; but at the same time under shock, it could be readily broken. This enabled a cask of the material to be taken, the staves removed, and the macgrout broken into pieces ready for placing in the heater. Natural bitumen was also now being exploited actively; and it was very necessary for gas undertakings to look to their laurels. This matter of holding roads together was an important and a very live one. The point as to levelling the stone in making the road surfaces was of interest. Dry stone could be rolled without getting waves; but if they attempted to roll stone which had in it too much binding material, or if the binder was too fluid, they got what were called harmonic waves. In a little place in Shropshire, which he had lately visited, where the tar macadam road was put down in too lively a condition, they had at intervals of about a yard valleys and crests alternating; and although these were called harmonic waves, they were anything but harmonic to motorists. [Laughter.] But if, to start with, the dry stone was rolled without the binder in it, it could be got quite level; and then the grout was poured over the stone from a ladle. After it was put on the stone, the roller went over it; and it kept down, and did not rise again. The roller could be put on five minutes after the grouting had been poured on. After the first grouting and rolling, it was flushed up with the grouting material, sprinkled with chippings, and then traffic could be put on it immediately. There was no waiting; and they had then the lovely surface shown in the final photograph illustrating this matter.

Test for Ductility: Test piece 1½ inches square Section. Start of Test, length 5⅛ inches. Total weight suspended, 21½ ounces.

Test for Ductility: 3 mins. 20 secs. after starting, length 17¼ inches.



Test for Ductility: 4 mins. 58 secs. after starting, length 36½ inches.



Test for Ductility: 7 minutes after starting, length 78 inches.

Test for Tenacity: 6 inches Square C.I. Faced Plates, showing Iron Plates with 9 cwt. 31¼ lbs. suspended. Temperature 70° Fahr. Weight required to part Plates 1456 lbs=40·4 lbs. per square inch.

Test for Tenacity: 3 inches square marble Blocks, showing blocks with 140 lbs. suspended. Temperature 77° Fahr. Weight required to part Blocks 163 lbs.=18·1 lbs. per square inch.

Temperature during Tests, 73° Fahr.

GLOVER'S "MACGROUT" AS MANUFACTURED BY THE BRITISH GASLIGHT COMPANY, NORWICH.

THE MOTOR FUEL OUTLOOK.

Improved road surfaces have been necessitated by the new fast traffic due to the use of mechanical traction, and, as we have seen, the bituminous product from the distillation of tar may be of great service to the road maker. The rapid increase in mechanical traction and the use of internal combustion engines for launches and a variety of purposes, threaten to cause the demand for motor spirit to overtake the supply, and every source is being strained to keep pace with the growing demand. In this country alone 100,000,000 gallons of motor spirit were used last year. It is natural under these circumstances that the resources of the gas, and the kindred coke, industry should have been carefully scrutinized as to their capacity to produce motor spirit, and that suggestions, more or less wide of the mark, should have been made for increasing the production from the gas undertakings of the country.

From high temperature tar produced by six-hour charge carbonization, the yield of benzol is only about 0·15 gallon per ton of coal. The same quantity is said to be yielded by coke-oven

tar. But in addition to this quantity obtained by distilling the tar, from 2 to 3 gallons can be recovered by scrubbing the coke-oven gas. This is a practice not at present applicable to the gas we supply, as the gas, depleted of benzol and toluol, would be practically non-luminous, and its calorific value would be reduced about 7 per cent.

Practically the whole of the benzol hitherto obtained from gas-works tar has been required for home industries (apart from motors) and for export. The tars from the low-temperature distillation of coal—that is, at temperatures below 500° C.—are said to contain 3 gallons of motor spirit per ton of coal, to which might be added probably another 3 gallons if the gas were scrubbed with heavy oil. Now while it is at present impossible to conceive either of non-luminous gas being supplied, or of low-temperature distillation entirely displacing our present methods, it is worth consideration whether a combination in the larger works would not be advantageous. The stripped low temperature gas would make an excellent diluent in place of water gas, to add to ordinary coal gas. An attractive, free burning, domestic coke would be produced, and the heavy part of the tar, after removing the naphthas, would be a pure and tough variety, similar to natural bitumen.

There is another promising source of motor spirit made possible by the newer methods of carbonization now in use. The tars from both full horizontal retorts and from verticals contain a large proportion of low-temperature distillates and cresylic acid, which, if subjected to the process of "cracking," would yield, I believe, a good proportion of spirit; and it is to be hoped, for the sake of the motor industry as well as our own, that developments may take place that will enable a substantial quantity of motor spirit to be contributed from gas-works to the huge total which will be required in the near future.

The cracking process practically consists in distilling the oils at a temperature higher than the normal boiling-points of the constituents which it is desired to decompose. This may be brought about by distillation under pressure, or by allowing the condensed distillate to fall into the highly-heated residue in the still. The result of this treatment is that the comparatively heavy oils undergo dissociation into specifically lighter hydrocarbons of lower boiling-points. As with road tar so with motor spirit, it is a matter for sympathetic co-operation—in this case between the gas engineer and the tar distiller. On our part, we should do well at this juncture to adopt an attitude of alertness in watching the trend of events, to keep out of the seat of the scornful, and, while holding fast that which is good, be ready to prove any promising process or method which is likely to be remunerative.

Comparative Distillations of Various Tars.

Low-Temperature Tar.

Sp. Gr. 1·073 at 60° Fahr.

Tar yield	23	gallons per ton of coal,
Water	2·64	p. ct. by volume.
Up to 170° C.	3·10	,, ,,
170° to 270° C.	30·42	,, ,,
270° to 350° C.	26·00	,, ,,
Pitch	37·84	,, ,,

Twelve-Hour Tar, Horizontals.—Yorkshire Coal.

Sp. Gr. 1·115 at 60° Fahr.

Tar yield	11	gallons per ton of coal.
Water	2	p. ct. by volume.
Up to 170° C.	4·22	,, ,,
170° to 270° C.	33·50	,, ,,
270° to 350° C.	21 80	,, ,,
Residue—pitch	38·48	,, ,,
Free carbon	8·649	p. ct. by weight.

Light Oils—Low Temperature Tar.

Up to 170° C.

Below 100° C.	15·60	p. ct. by volume.
,, 120° C.	31 20	,, ,,
,, 140° C.	54·70	,, ,,
,, 170° C.	82·80	,, ,,
Over 170° C. and loss	17·20	,, ,,

Light Oils from Twelve-Hour Tar.

Up to 170° C.

Below 100° C.	15·00	p. ct. by volume.
,, 120° C.	44·00	,, ,,
,, 140° C.	66·00	,, ,,
,, 170° C.	89·50	,, ,,
Over 170° C. and loss	10·50	,, ,,

Six-Hour Tar, Horizontals.—Yorkshire Coal.

Sp. gr. 1·200 at 60° Fahr.

Tar yield	10	gallons per ton of coal.
Up to 170° C.	6·0	p. ct. by volume.
170° to 270° C.	16·0	,, ,,
270° to 350° C.	6·0	,, ,,
Residue—pitch	68·8	,, ,,
Free carbon	17·0	p. ct. by weight.

Coke-Oven Tar.

Sp. gr. 1·170 at 60° Fahr.

Water	2·3 p. ct.
Up to 170° C.	3·7 ,,
170° to 270° C.	21·8 ,,
270° to 350° C.	4·3 ,,
Pitch	67·0 ,,

Continuous Vertical Retort Tar.

Sp. gr. 1·074 at 60° Fahr.

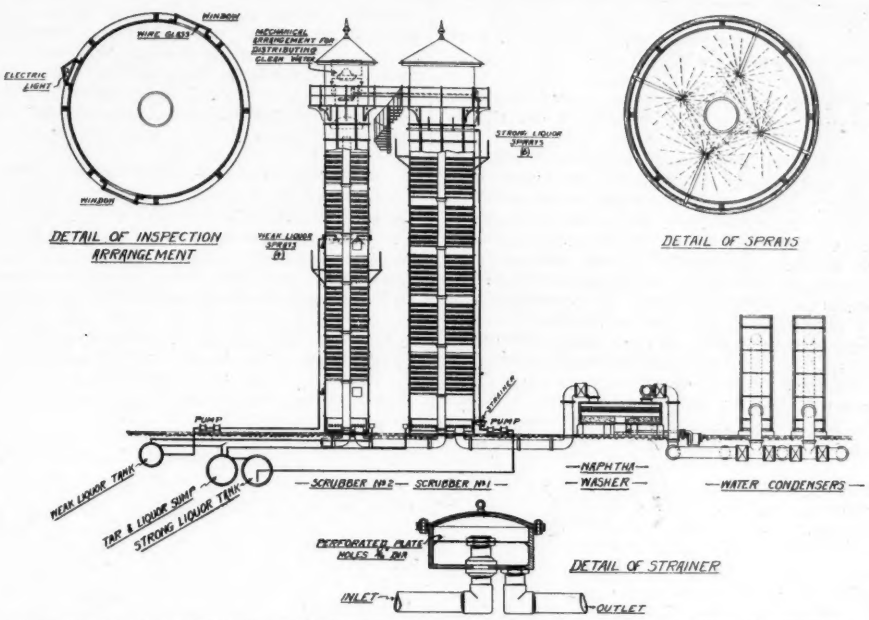
Up to 170° C.	9·1	p. ct. by volume.
170° to 270° C.	25·7	,, ,,
270° to 350° C.	24·9	,, ,,
Residue—pitch	46·0	p. ct. by weight.
Free carbon	3·1	,, ,,

DISTILLATES OF TAR, AND SHALE RETORT WORKING.

At this place, the President again broke off from the prepared address. First of all there was thrown on the screen a slide showing a table of the distillates from different qualities of tar. The tars, he remarked, varied very considerably, according to whether they were high-temperature or low-temperature ones. Tars from filled horizontal retorts were practically low temperature tars, and so in most respects were tars from verticals. In the table, the low-temperature tar—say, 500° C.—was compared with the Norwich tar from their twelve-hour working. In the low-temperature tar, up to 170° C., they got 3·1 per cent. by volume of naphthas; and the corresponding figure in the tar from the twelve-hour working was 4·22 per cent. These figures corresponded very closely. From 170° to 270° C., they had 30·42 per cent. and 33·50 per cent., which also corresponded very closely, and so did the other figures. When they came to distilling the light oils from the two tars, a distinct difference per cent. was seen. There followed some slides showing the improvement in the working of the shale retorts in Scotland. The President observed that, as the members knew, the shales of Scotland provided a great deal of oil; but it was perhaps not known to many of them what crude things were the early retorts for the distillation of shale. The earlier retorts were almost devoid of mechanical arrangements. Then they had the Young and Beilby retort, which was run in the upper part for low temperature and in the lower part for high temperature; and special attention was given in it to the treatment for ammonia. A further development took place by the admission of steam in the lower part, which helped the production of ammonia; and it also assisted in making producer gas. A little air was likewise admitted for burning out the carbon from the residues which were dropping continuously. The gas, after being washed with heavy oil for the removal of the paraffins, was returned to the heating arrangement. Originally they had producers embodied in the setting for heating the bench; but they had now got it so perfect that all the gas required for heating, after being stripped of its volatile matter, was brought back to the heating process.

AMMONIA RECOVERY.

Then the President (still apart from his prepared address) proceeded to point out that 10 per cent. of the coal bill of gas-works was obtained by the recovery of ammonia; and he wished to show the members an improved method of working tower scrubbers so as to improve the ammonia results. The methods of recovering ammonia were very roundabout, and very costly. It cost about £4 a ton to make sulphate of ammonia after they had obtained the liquor; and it cost £7000 for a 2 million works to put down scrubbing and washing appliances to get the liquor. The £4 cost of making was against £2 by direct method. The essence of the direct recovery of ammonia was to keep the gas hot at this point, and to take out, by careful methods, all the tar particles to prevent the discolouration of the sulphate. Another point which had to be watched from the gas makers' point of view was the illuminating power. Thirty or forty years ago, attempts were made to wash gas with acid for making sulphate of ammonia direct. These attempts had been renewed lately in some of the small gas-works in the South of England; and illuminating power was not now such an important matter as in the old days. Washing by sulphuric acid had two effects: It affected the illuminating power disadvantageously, and the hydrocarbons affected the colour of the sulphate. The Simon-Carvès people took out the coarse tar first with a cyclone arrangement; and then, by a pneumatic centrifugal arrangement, they removed the fine floating particles—rendering the gas absolutely clean of tar. The gas then travelled to the saturators; and the saturators were charged with a solution of sulphuric acid containing only 5 per cent. of free acid, so that the illuminating power was not injured. In this way, the process was actually at work at a coke plant; and it was being applied to one of the large gas-works in the Metropolitan area. It was a matter of great interest. What he had now to show was a very humble affair; but it might help some who had tower scrubbers to make the most of them. The first tower scrubber in the illustration was originally filled with coke, and had a mechanical distributor, with a liquor supply from an overhead tank. The scrubber was now filled with boards, and was fitted with jets spraying liquor supplied from the bottom—the liquor having been previously strained. The second scrubber was even more interesting. It was supplied with plate-glass windows—wired, and of fairly good size. The windows were opposite each other; so that, if the scrubber was doing its work properly, they could see right through to the part of the yard the other side, which showed that the gas was clean. This scrubber had weak liquor circulating through it; and the upper part had water supplied to it. The scrubbers were first put down in the "Seventies" to clean a million cubic feet of gas a day. Now, under the new conditions, they were quite capable of dealing with two million cubic feet. The essence of it was in the first place to keep the gas clean and to remove the tar fog. There was another point about the direct-recovery process. In connection with the small retorts of gas-works, they had so much condensing power



MR. GLOVER'S IMPROVED ARRANGEMENT FOR THE WORKING OF TOWER SCRUBBERS.

(as compared with coke-ovens) that there would be no difficulty in delivering gas to the saturators at a temperature above dew-point.

The PRESIDENT then proceeded with his address as follows:

MANUFACTURING COSTS.

I am afraid too much of your time has been taken in the consideration of these secondary products, and that other important matters can on this occasion be dealt with only in a brief and unsatisfactory fashion. I must, however, say a few words on other items of manufacturing cost.

Purification is a process, when conducted with oxide of iron, which costs little, and that little may in some cases be entirely wiped out by a mutually satisfactory arrangement with the acid maker to return to the gas-works the burnt oxide, which, after treatment by a simple process to restore its hydration, can be brought into service again. Where such an arrangement can be worked, very little new oxide will be required. An English natural oxide, having the merit of being delivered in a dry condition, has been found to compensate for losses incident to the handling of the material, and to give excellent results.

The catalytic process for the reduction and removal of sulphur compounds so successfully developed by the South Metropolitan Gas Company will be followed with keen interest by that Company's many friends and admirers. There can be no question as to the desirability of reducing the sulphur to the lowest possible limits, when this can be done without resorting to so clumsy, costly, uncertain, and objectionable a process as lime purification. Our newer forms of carbonization have done a great deal to reduce sulphur compounds, and practically there is no sulphur question where a proportion of water gas is used in conjunction with the methods of carbonization to which reference has been made. The ideal method of working, however, must be the one which leaves all the sulphur behind at the works.

The charges against manufacture coming under the heading of wear and tear will, with prudent management, cover obsoletism in plant and buildings, and the manufacturing plant will be kept thoroughly up to date, with a declining capital cost per 1000 cubic feet of gas made. If we are intent on selling cheap gas, however, the cost of repairs will require to be carefully watched; and one of the important items capable of swelling our expenditure is the renewal of retort-settings.

REFRACTORY MATERIALS.

The quality of refractory material is rather a vexed question; and in spite of the rousing the manufacturers have recently received, one cannot feel confident that the best is being made of the splendid quality of raw material which this country possesses. When we can with confidence buy ordinary fire-bricks which will stand without shrinking or fusing a temperature of 2000° Fahr., and silica material not subject, when heated, to undue expansion, we shall experience a pleasant relief from constant uncertainty as to how long settings are likely to last. After trying many combinations of material to stand the high temperatures required for settings of tens, I am beginning to realize that 2000 working days may be reasonably expected out of silica brick-built retorts; and if this experience is attained, and repeated, I think that we may be fairly satisfied.

The built retort does present a way out of the difficulty of getting retort material of British manufacture to stand high temperatures, inasmuch as the special shaped bricks can be made of material of a highly refractory nature, not suited for the making of moulded retorts. But let anyone putting in silica brick retorts for the first time take the precaution to use bricks of Stourbridge, or similar, clay next to the mouthpieces. The chemical action of the condensed alkaline liquor about the mouthpiece will quickly reduce silica material to powder.

WORKING MEN CONDITIONS.

In the matter of wages for carbonizing, it is pleasant to find one's efforts to ameliorate the conditions of labour rewarded by contentment, and that this blessed condition is not inconsistent with low costs where efficient labour-saving appliances are provided. It is praiseworthy and an excellent trait in many of our British working men that they are brave and cheerful in the midst of difficulties and hard work. It is our duty, as far as possible, to find remedies and provide improved alternatives where jobs are of a galling nature which give no satisfaction to the worker. The clinkering of furnaces affords an illustration. In the setting of tens, the spacing of the pier walls and the regenerative construction only allows of a furnace grate area of three-quarters of a foot per 10 ft. 6 in. run of retort. This is sufficient with certain coals and high temperatures can be maintained. With other coals containing certain proportions of lime and iron in the ash, the clinker is difficult to remove. After carefully observing the process of clinkering for a few days, it was decided, as a trial, to double the grate area by providing, in one setting, a supplementary furnace back to back with the existing furnace. The result is that the work of cleaning the furnaces is now much lighter, more satisfactory to the management, and steadier retort temperatures are maintained. It is better to observe and smile than simply expect certain results and frown when they are not forthcoming.

Limewash the retort-houses and cultivate a spirit of cheerfulness is another prescription I recommend for pleasant relationships between the management and employees.

Smile awhile,
And when you smile
Another smiles;
And soon there's miles and miles of smiles,
And life's worth while
Because you smile.

COAL PRICES.

We shall be disposed to smile more freely when the burden of inflated coal prices has given place to more normal conditions. But in so far as high prices are the natural outcome of an unexampled period of good trade, we must not complain too bitterly. Those of us who live in industrial centres know that good trade means that the spending power of the people is increased, and a larger consumption of gas follows. But the uncontrolled rush on the part of coalowners to realize, by turning the country's mineral wealth into coin as fast as possible, and the fact that foreign countries can be supplied with the Englishman's coal at lower prices than many of his own people, is a matter for concern and investigation. We must not forget, however, that high prices for solid fuel turn the attention of householders and manufacturers to the advantages of gaseous fuel; and that while almost every necessity of life has risen in price, gas has not so far (in any important instance) been raised in price.

SELLING PRICES.

The use of gas as a fuel grows apace. Fresh developments are constantly occurring—some calling for special treatment where the ordinary selling price would render the use of our gas impracticable. The roasting of malt, for instance, for making stout will serve as an illustration. The question of producer gas and town gas being in the balance, the rebate tariff turned it in our favour, and a very satisfactory consumption was secured. Occasionally one meets with an undertaking where an unyielding or a too timid policy in regard to differential charges is pursued; and we hear of

large consumers being lost, or of failures to secure equally promising outlets for gas. It can be summed up by saying that such a policy would not be considered either right or wise in any other business.

"What is the cost-to-sell?" is an American phrase borrowed from "Scientific Sales Management." If we were asked the question, I am afraid we should have to answer, "We have not paused to consider it." We now recognize that we must adopt commercial methods for selling our chief product, and the cost of maintaining and increasing sales will be borne partly by the profit on the apparatus we sell or hire, and partly (almost imperceptibly) by the gas, which is not sold once, as an ordinary article of commerce, but the sale of which, with a satisfied consumer, goes on from year to year. Our outdoor staffs may need careful supervision to secure the efficiency we aim at; and there are abundant opportunities for costs to run up by the wasteful handling of material. But I am sure we are all realizing the benefits which accrue where generous treatment in the department in touch with the consumers is the adopted practice.

At the close of the address,

Mr. A. F. Browne (London) said he rose with much pleasure, and a high sense of the honour of doing so, to move a vote of thanks to the President for his address. He quite despaired of being able, in anything he had to say, to convey in adequate manner his own feelings and those of the other members as they sat there and listened to the address. It would not be wrong to say, it would not be bad taste to say, that they must feel that they had been listening to an address quite *sui generis*. If they could not say too much in Mr. Glover's presence in praise of the address, that was no reason why they should not think the more. It had given them "furiously to think;" and as they perused it again, and thought the matter out, they would come to the conclusion that they could not appraise it too highly. The address was both learned and comprehensive—learned not in the scholastic sense, but in the amount of knowledge displayed of current problems of gas manufacture and supply; and comprehensive in the number of subjects on which Mr. Glover had lightly touched. There was another picture. He pictured Mr. Glover on his works. They saw the idealist-practical man who was confronted with problems, and set about devising special means of overcoming them. Then they saw him as a constructing engineer putting up plant which he had illustrated by excellent views. They found him mastering the problems which, in common with other gas engineers, he was called upon to solve; and as an individual engineer in the City of Norwich, they found him overcoming difficulties, some of which might be quite special to the locality. He had given them, both in words and by pictures, an account of the success that he had obtained in recapturing the falling market in coke, and making it a rising market, and in taking the best advantage of the method of dealing with tar which came about a few years ago and in applying it to road work. They saw him again as the commercial man realizing the necessity of giving the consumer what the consumer wanted in the most convenient form, and at the lowest possible price. There had been a modest allusion to the fact that their President had occupied the presidential chair of the Institution. They knew that his presidency then redounded very much to his credit, and that he quitted the chair with enhanced reputation. It was therefore a matter of gratification to every man in the room that Mr. Glover was induced to again take the presidential chair of a District Association. They were proud of him, for they recognized in him one who, in the view of the whole gas industry, was a front-rank gas man. They began to wonder how much knowledge Mr. Glover's head could carry; and what could not be found in his head about gas matters was not worth knowing.

Dr. Rudolf Lessing (London), in seconding, remarked that Mr. Glover was a past-master in composing presidential addresses; and it was most unfair for his possible successor to be the subject of comparison in regard to his presidential address. He thought Mr. Glover's capacity for attracting the attention of his audience was even superior to the adhesive properties of his macgrout. [Laughter.] He thought the picture that Mr. Glover drew at the beginning of his address as to a visitor to his works spending a morning with the manager could be amplified. He (Dr. Lessing) saw not a single visitor, but quite a number of visitors, and these visitors would there receive a very hearty welcome. Gas engineers had enjoyed the hospitality of the British Gaslight Company at the Norwich works once before since Mr. Glover had been in command there—that was when he was in the presidential chair of the Institution. They, as members of the Southern Association, were most interested in the prospective visit that they hoped they might pay to the works in the summer.

The motion was carried with applause.

A Visit to Norwich.

The President, in reply, said that he was much touched by the words of Mr. Browne and Dr. Lessing, and the heartiness with which the motion had been received by the members. Dr. Lessing had described him as a master-hand, or something of the sort, at composing presidential addresses. If he knew how much anxiety and sweating he (the President) had in conceiving the lines on which to construct his address, he would probably form a different opinion. However, he was very gratified that this little effort of his had been received so nicely by his friends of the Southern Association. Dr. Lessing had alluded to the possibility of a visit to Norwich. It was his (the President's) pleasure to say that the Directors of the British Gaslight Company would give the members, if they would come, a nice lunch and a hearty welcome, and would be pleased for them to inspect the works. They would all be delighted to see the members in Norwich, if convenient arrangements could be made for travelling there. [Applause.]

Microscopical Examination of Coal Sections.

The President said he owed an apology to his own brother (Mr. Samuel Glover). He had brought with him to the meeting some lantern slides of microscopical representations of sections of coals; and he had intended to give the members a demonstration with these on the lantern-screen. It was now too late; but he (the President) would bespeak for the members a hearing on another occasion—perhaps at the next meeting. Microscopic sections of coal constituted quite a new study. His brother had made a study of the matter, and had followed it closely. He (the President) was sure the members would be interested.

This concluded the business proceedings.

Annual Dinner.

Immediately afterwards, the members passed to an adjoining room, where they dined together; and then spent the remainder of the evening in listening to speech, song, and recitation. The toast of "The King and Royal Family" was honoured. Then the President of the Institution of Gas Engineers (Mr. Edward Allen) gave the "Southern District Association of Gas Engineers and Managers;" response being made by the President. Mr. Percy Griffith proposed "The Past-Presidents and Committee;" the reply being in the hands of the immediate Past-President (Mr. H. O. Carr). The President submitted "The Institution of Gas Engineers and Kindred Associations;" and reply was made by Mr. Allen. "The Honorary Secretary" (Mr. H. C. Head) and "The Visitors and the Press" were the remaining toasts. The evening was a most enjoyable one.

LONDON AND SOUTHERN JUNIOR ASSOCIATION.

Visit to the Stepney Gas-Works.

The three lectures on "Gaseous Combustion" which were given by Mr. L. F. Tooth, of the Commercial Gas Company, some weeks ago at the Westminster Technical Institute, were appropriately followed on Saturday afternoon by a visit of the members of the London and Southern District Junior Gas Association to the furnace laboratory at the Stepney Gas-Works, where the various apparatus for the utilization of gas which Mr. Tooth has designed was seen in operation. At the conclusion of the third lecture, it will be remembered, a melt was carried out in a furnace which had been specially fitted up for the occasion in the basement at the Institute; but at Stepney, of course, a much more comprehensive demonstration was possible. The attendance was a large one; the visitors probably numbering over seventy.

On reaching the works, the members were (in the unavoidable absence of Mr. Stanley H. Jones, the Engineer) received by Mr. G. M. Gill, the Assistant Engineer to the Company, who had something of his own to show them in the retort-house. This was a furnace clinkering machine which he has designed, with the twofold object of securing greater economy and rendering easier what has hitherto been particularly laborious work for the men. A photograph of the machine, with some notes on its working, will be found on p. 721 of this issue. It can be operated by compressed air, hydraulic power, or steam; and as most gas-works already use at least one of these sources of power for some purpose or other, the installing of the clinkering tool presents no obstacle in this respect. The machine in use at Stepney is actuated by compressed air; and during the couple of months or so which it has been at work, it has given every satisfaction. A furnace was ready for clinkering when the party arrived; and they watched the putting in of the false bars and the removal of the grate beneath. Then the clinkering machine was wheeled up to the front of the furnace, anchored back and front; and the ram, with a cutting tool at its head, was set to its task of breaking-down the clinker. For the operator, the work, after the removal of the grate, is (as one speaker remarked) "child's play"—certainly it is, compared with the previous handling of an iron bar weighing half-a-hundredweight or so. He stands at the back of the machine, guiding the ram to the spot at which it is required to strike, and regulating the force of the strokes to be delivered. Evidently, the operation of the machine does not call for any special skill, or for any exceptional degree of intelligence; and it is a tool that should make itself popular in gas-works. The time taken to clinker a furnace by its aid varies, of course, with the fuel used and the condition of the furnace; but in any case it is only a matter of a very few minutes. The furnace the members saw clinkered on Saturday—not a very heavy one—was done almost before there was time to grasp the manner in which the machine works.

A move was then made to the furnace laboratory, where the visitors found other interesting demonstrations awaiting them. There are furnaces here for almost—if not quite—every conceivable

purpose for which a furnace can be required; and Mr. Tooth had arranged for a sufficient number of them to be in full working order to ensure the members having a warm reception. It was noticed that the buildings devoted to furnace work have been considerably extended; and it will not be surprising to see further additions made in the near future. The idea is excellent, of having furnaces of various sizes and types available for the use of inquiring manufacturers, who are thus able to bring along their metal, and carry out tests on their own account, before deciding what sort of furnace would best please them. Various furnaces of Mr. Tooth's design have at different times been described in our pages; but on Saturday they were all to be seen side by side—and an imposing array they made. An afternoon in the furnace laboratory and foundry at the Stepney Gas-Works inspires one with a large degree of confidence in the continued expansion of the use of gas for industrial purposes.

When the members reached this portion of the works, they were shown first the process of melting 50 lbs. of nickel in a 60-lb. crucible furnace; the time occupied being 2½ hours. This was mixed with 120 lbs. of cast iron, which was melted in a 250-lb. crucible furnace, to make a nickel-iron tray for a muffle furnace for the treatment of bullion. Another demonstration given was with a cast-iron tilting furnace, built on the recuperative principle, in which 300 lbs. of brass was melted in 1½ hours, with a consumption of about 490 cubic feet of gas. Glass bending was being carried out in a furnace heated up to about 1200° Fahr.; and there were also running a range of furnaces for annealing, case-hardening, and tempering of steel, at varying temperatures of from 1000° to 1400° C. A special type of furnace was shown for reducing 5 lbs. of nickel, starting from a dead-cold furnace, in 1½ hours. Further, there was in working order a "glory hole" for glass-working, recording temperatures up to 1500° C.

In a separate building were set out pyrometers, &c., and samples of various clays, illustrating the mixtures used for furnace making according to the various requirements to be met. There were many different burners here—of the Tooth, Fletcher-Russell, and Smith-Walter patterns—and the oxy-coal gas blow-pipe was cutting metal bars and plates in quite the most approved fashion. So much enterprise as is being shown by the Commercial Gas Company should receive its reward; and it is pleasing to note that it is doing so. A very complete system for bringing in every possible consumer is in operation. In fact, canvassing as practised by the Company is a science—an "exact" science.

The inspection of the furnaces completed, the party were invited to take tea; and with this the visit closed. But before separating, the thanks of the members to the Company for an instructive afternoon were voiced.

The President (Mr. S. A. Carpenter, of the North Middlesex Gas Company) remarked that the clinkering machine was most interesting; and the workmen who used it ought to be very grateful to Mr. Gill, because clinkering, which done by hand in the ordinary way was a very arduous process, with the machine was child's play. As to the furnaces they had inspected that afternoon, the use of gas for industrial purposes in such a district as that supplied by the Commercial Gas Company was a very big thing. The Company were giving all the attention to the matter which it deserved; and it was pleasing to those present to see the name of Mr. Tooth—a Past-President of the Association—so closely allied with these furnaces. As Mr. Tooth had pointed out, gas was rapidly superseding other forms of fuel, because it was more economical, and with it more accurate results could be secured. A very important point, too, was that with gas work could be carried out so quickly.

Mr. James Hewett, who proposed a hearty vote of thanks to the Commercial Gas Company, said he was sure the members were all agreed that the afternoon had been well spent. They had heard a great deal about the progress which the Company had made in the use of gas-fired furnaces; and now they had had an opportunity of seeing these furnaces in actual operation. The idea of having what might be called a show-room for furnaces, was an extremely good one. It afforded an opportunity to Mr. Tooth and his assistants to continually bring about improvements, and it also allowed likely customers to come and see for themselves what the apparatus would actually do—a very desirable thing in a district like this, where one was surrounded by manufacturers. It was a pleasure to see suggestions for the elimination of the more arduous forms of labour; and the clinkering machine they had inspected that afternoon evidently did remove from the shoulders of the men a great deal of very hard work. Gas engineers were always anxious to improve the conditions of the men under their charge; and the employees themselves would no doubt appreciate the advantages of a machine of this character, and do their best to make it a success. He desired to couple with the vote the name of Mr. Gill; and they must not forget Mr. Tooth, who had doubtless been largely instrumental in bringing about this visit.

Mr. F. A. Frost seconded the vote; and it was carried with applause.

Mr. Gill, in acknowledgment, expressed on behalf of Mr. Jones his regret at not being able to be present. Mr. Jones was, he said, only too willing at all times for members of the Association to see anything the Commercial Gas Company could show them. The whole of the afternoon's arrangements had been in the hands of Mr. Tooth, to whom their thanks were due. They had seen a number of furnaces, the credit for designing which belonged entirely to Mr. Tooth, who had exercised no end of ingenuity and skill in adapting gas to various purposes. He could make the greatest amount of use of a cubic foot of gas, which was a very important point in these days of severe competition. All the furnaces had been constructed on the works, under Mr. Tooth's charge; and they were daily giving demonstrations to likely consumers, who brought their own metal, &c., for melting. It would be a pleasure to him (Mr. Gill) to see the members at any time at the Wapping works. So far, he believed, they had not been there.

A BELGIAN GAS AND COKE-OVEN WORKS.

The "Bulletin" of the Belgian Gas Association for the past month contains the text of a paper read at the December meeting by M. Bertholet, the Manager of the works of the Grivegnée (Liége) Coke-Oven and Gas Company. Readers are aware that the supply of coke-oven gas is extending in Belgium; and therefore the following particulars as to the works in question will be of interest.

Situation and Capacity of the Works.

The works stand on an area about 14 acres in extent, and adjoin those of the Athus-Grivegnée Company, who take all the available gas and coke produced by their neighbours. The coking plant, consisting of 112 Evence-Coppée ovens, is equal to distilling 750 metric tons of coal per 24 hours, and producing 560 tons of metallurgical coke, about 7¾ million cubic feet of gas of the calorific value of 468 B.Th.U. per cubic foot, from 22 to 25 tons of tar, and 8 tons of sulphate of ammonia. For the carriage of the material there is a branch line connecting the works with the Belgian State and Northern Railway; use being made of the Athus Company's metals. The coke-works are connected by an overhead line with the wharves on the Ourthe Canal belonging to the last-named Company; and this assures carriage by water.

Description of the Plant.

The coal is raised from the boats by two 80 H.P. electric cranes, running over ferro-concrete bunkers. Each crane has a grab of 88 cubic feet capacity, which deposits the coal in two bunkers each holding 300 metric tons. As the wharves are also connected with the railway, the cranes can unload the trucks by means of grabs of 53 cubic feet capacity. From the bunkers the coal falls into the skips of an overhead conveyor, driven by a 56 H.P. motor, which carries the coal either directly to the crushing plant or to the store. Each crane will unload 60 tons of coal per hour; and the aërial line, with skips of 50 cubic feet capacity, can carry 120 tons per hour. The overhead line is 1430 yards long. The contents of the skips on this line are sometimes emptied directly into the crushers, and sometimes into the store, by means of a travelling crane, which spans the coal yard to the extent of 180 feet, and runs along its entire length of 415 feet. In order to allow of the storage of different qualities of coal, the yard is divided into five compartments by rough concrete walls; and there can be stacked therein, to the height of 16 feet, from 28,000 to 30,000 tons of coal. Running upon a track parallel with the crane used for stacking is a travelling crane, having a span of 180 feet, worked by electricity. It takes coal from the yard, and deposits it in a 50-ton hopper. When this is full, the crane lifts it above the screening plant, into which it is emptied. The coal is conveyed, either by skips or by the yard crane, to one of the four 100-ton receptacles, each of which has a sizing-screen, which, by means of a movable baffle, discharges a determined quantity of coal on to a conveyor. The different kinds of coal are conveyed, in well-defined proportions, by a bucket chain to two Carr breakers, from which it is thrown into a mixing-screw. It then goes into the hopper of a large bucket chain, which raises the mixture into a ferro-concrete tower of 800 tons capacity, and equal to the supply of the ovens for 24 hours. The whole of this plant has been calculated for dealing with 60 tons of coal per hour. It is worked by an electric motor of 170 H.P. for breaking, and by another of 27 H.P. for the bucket chain of the tower containing the broken coal.

As already mentioned, there are 112 ovens on the Evence-Coppée system, with heat regeneration and recovery of bye-products. Each oven is 32 ft. 9 in. long, about 8 feet high, and, on an average, 18 inches wide; and it will deal with 7 tons of coal per 24 hours. The ovens are divided into two groups by the concrete tower previously alluded to. Each group is served by a chimney 180 feet high, which divides it into two batteries of 28 ovens. By this arrangement it is possible to effect any necessary repairs to the regenerator with a stoppage of only one battery of ovens. After the gas produced has been used for heating the ovens, there is a surplus of at least 50 per cent., which is taken by the Athus Company. The ovens are served by two dischargers, worked by an electric motor of 40 H.P.; two chargers, worked by one of 20 H.P.; and two coke-sorting machines, with oscillating screen, actuated by three motors—one of 31 H.P. for raising the skip, another of 20 H.P. for moving the machine, and the third of 6 H.P. for the screen.

The distillation of the coal occupies from 24 to 30 hours. The resulting gas is conveyed by an ascension-pipe into one of the two hydraulic mains, which are required for separating the rich gas—*i.e.*, that having an average gross calorific power of 550 B.Th.U. per cubic foot—and that which has only from 440 to 500 B.Th.U. The broken coal falls from the concrete tower into the charging-machine, which is divided into three receptacles equal to containing altogether about 7·5 metric tons—the total charge of an oven. The charger, worked by a 20 H.P. electric motor, is moved over the three openings for filling the oven, and empties its contents into them; the coal being levelled by the rod of the discharger. At the end of the distillation period, a drawing-machine, driven by a 40 H.P. motor, pushes the coke on to an incline, where it is slaked by jets of water. It then falls into a skip, by which it is raised to the jigger table. The large coke falls into waggons for

despatch to the works at Athus or at Grivegnée; and the small coke falls between the bars of the table into a hopper, whence it is conveyed to a combined breaker and screen, by which it is separated into three classes, suitable for boiler stoking, for use in small metallurgical operations, and for domestic purposes.

Treatment of the Gas.

All the gas made is drawn off by means of rotary exhausters, and passed through vertical tubular water-cooled condensers; the products being collected in three underground masonry tanks, in which the tar and ammoniacal liquor are separated by their different specific gravities. It then goes successively through Pelouze and Audouin tar-extractors, which take out the last traces of tar, a sulphuric acid bath, and saturators on the Mont Cenis system, which convert into sulphate the ammonia still remaining. At the outlet of these saturators the gas will usually contain less than 3 grammes of ammonia per 100 cubic metres—say, 46 grains in about 3530 cubic feet.

The gas for heating the ovens is not further purified; while the rest passes into dry condensers, where it gives up its aqueous vapour, and eventually the acid is carried forward from the saturator. To remove the sulphuretted hydrogen, it is passed through four oxide of iron purifiers, each containing 80 tons of material in four layers, and presenting a passage of about 3100 square feet; so that the gas does not travel at a greater speed than 12 inches per minute. Finally the gas passes into a three-lift holder of rather more than 700,000 cubic feet capacity, and is drawn therefrom by three compressors, measured by two meters, and pumped towards the works at Grivegnée. The duplex station meters are capable of measuring nearly 4 million cubic feet of gas per 24 hours, and each centrifugal compressor can pump 176,000 cubic feet of gas per hour at a pressure of 20 to 26 inches of water.

The Ammonia-Recovery Plant.

The most striking feature of the products plant is the recovery of the ammonia and its conversion into sulphate by the semi-direct Mont Cenis system. The ammonia is removed from the gas in two ways—viz., in the form of ammoniacal liquor in the collectors and condensers, and as sulphate of ammonia in the saturators. The liquor collected is treated in two distilling columns with the addition of lime, and the fixed and volatile ammonia are set free. The ammoniacal gas, which contains a great deal of aqueous vapour, is dried before being introduced into the saturators. When the bath of a saturator is charged with sulphate, and this is precipitated, it is withdrawn by a compressed air ejector, which sends it into a drainer, whence it falls into a centrifugal drier, actuated by a steam-turbine. The dried sulphate is then mechanically conveyed into the store.

Other Particulars of the General Plant.

The types, dimensions, and capacities per 24 hours of the various appliances are as follows: Two Beale rotary three-blade exhausters, 5,300,000 cubic feet; one ditto, 2,650,000 cubic feet; eight vertical tubular water cooled condensers; two Pelouze and Audouin tar-extractors, 5,300,000 cubic feet; one ditto, 2,650,000 cubic feet; two Mont Cenis saturators, 5,300,000 cubic feet; one ditto, 2,650,000 cubic feet; three vertical condenser-driers. The smaller-sized appliances are for dealing with the rich gas; one set of the larger size being for the gas to be used for industrial purposes, and the other being held in reserve, and serving for either kind of gas.

The steam necessary for distilling the ammoniacal liquor, and for working the driers, lime pumps, exhausters, compressors, &c., is furnished, at a pressure of eight atmospheres, by three Bailly-Malhot multitubular boilers having about 1700 square feet of heating surface, heated by coke breeze with forced draught.

The water required on the works is drawn from the neighbouring river by means of three centrifugal pumps, which deliver it into a circular tank, capable of holding 110,000 gallons, and standing on a framework at a height of 65 feet from the ground. From this tank it is distributed all over the works.

AN AMERICAN GAS ENGINEER'S IMPRESSIONS OF VERTICAL RETORTS IN ENGLAND.

Before the New England Association of Gas Engineers, at their recent forty-fourth annual meeting at Boston, Mr. C. A. Learned, the Manager of the Meriden (Conn.) Gaslight and Coke Company, read a paper entitled "Notes on Vertical Settings in English Works"—the result of the visit he paid to this country in the spring of last year, on which occasion he was welcomed by the members of the Institution of Gas Engineers at their meeting in June. Omitting some purely personal reflections on men and matters he encountered during his stay this side, Mr. Learned's paper is given nearly as he wrote it.

The subject of this paper has recently attracted the attention of many in the gas fraternity, and investigations were very active a year ago, when the price of gas oil advanced to a prohibitive figure—more active, doubtless, than they are to-day.

It is not the intention of this paper to make comparisons between types, but simply to note some of the conditions which exist, and give results on an English basis.

In an investigation of the English works many peculiarities impressed themselves upon me, and the dissimilarity of English and American conditions was marked: 1. The different kinds of coal used, and their gas-producing values. 2. The difficulty in making a comparison between English and American results in feet of gas per pound of coal. (3) The marked difference in the cost of coal at different works. 4. Of necessity, the wide variation in price per 1000 cubic feet for different cities and towns. 5. The various candle power requirements for different districts. 6. The great difference between the old and the new parts of carbonizing plants. 7. The size of old works, and their adaptability to the new style of settings. 8. The almost geographical division of the country into two parts—one manufacturer of verticals installing most of the settings in the North of England, and another most of the settings in Southern England. 9. The similarity of the two most popular settings of verticals so great that it was hard to choose between them. 10. The uniform satisfaction expressed by superintendents and engineers with the settings which they were using.

Until the year 1911 there were few companies in America that had given the subject of verticals much attention. For six years the settings have been passing through an experimental stage in England; and early in the development a Newark, N.J., gas machinery company thought they saw possibilities for the use of this new type of gas construction in America, and, after an exhaustive investigation, procured the American agency for the Woodall-Duckham system of verticals. About the same time another large American interest became allied with the Glover-West type of English verticals. The result of these alliances was a plant for 500,000 cubic feet per day in Derby (Conn.), and one for 250,000 cubic feet per day in Fitchburg (Mass.), of the above types respectively, installed during the year 1911. At present, duplicate equipments at each of these plants prove the faith of the purchasers in the efficiency of the installations. In the spring of 1912 the above were the only two plants of continuous verticals in use in this country.

In order to observe English conditions, and study the types in the home field, the writer and his son went to England last June. Anyone who has visited England, not having been duly attested or accompanied, and tried to see manufacturing plants, will realize the futility of such an attempt. Letters of introduction were therefore obtained; and the first plants to be visited were those in and around Manchester. This is the home of the Glover-West system, and where West's Gas Improvement Company do their machine work for Glover-West vertical settings.

Manchester.

A comparison of English and American working conditions, as found in this plant, might be referred to here. The working day begins at 6 a.m. and ends at 8 p.m. in the summer, when the sun sets as late as 8.20. Half-an-hour is allowed for breakfast, an hour for dinner, and half-an-hour for supper. A skilled machinist gets from $9·50 to $10·00 per week, while in this country the wage is nearly two-and-a-half times this amount. There is a Saturday holiday; and the shops open at 9 a.m. on Mondays. The hours of labour are therefore about 55 per week.

Manchester has Mr. J. G. Newbigging for its Gas Engineer. At the Rochdale Road works, within the city, he was installing a 2-million vertical plant, and later a duplicate is planned, of Glover-West verticals, where a 1 million old-style horizontal setting had been. At Droylsden, six miles away, and just outside Manchester, we visited the experimental plant where the process had been perfected. This was running, but not at full capacity. Some discarded experimental devices were seen here.

Rochdale.

At Rochdale, another township not far from Manchester, we saw a very modern Glover-West plant of 1¼ million cubic feet capacity. Mr. T. B. Ball, the Manager, stated that, with the verticals, he was able to get 1000 to 1200 cubic feet more gas per ton of coal than with the old plant, but with a slight decrease in candle power—say ¾ to 1 candle.

Heywood.

Another interesting plant, which was under municipal control, was then visited—Heywood. Mr. W. Whatmough, the Manager, took great pride in showing us around and noting the changes from the old to the new system. The town was small (27,000 people); output in 1912, 132 million cubic feet. The new equipment was one stack of Glover-West verticals, making on an average 243,000 cubic feet per 24 hours, of 17·6-candle power gas, in a No. 2 "Metropolitan" burner. One test made with their coal gave 12,300 cubic feet per ton of 14·5-candle power gas. This means little to us in America; for the grades of English coal are as many as their counties, and a coal mined near a works is used, or mixed with another grade of better gas-producing qualities.

Here the coal costs 15s. ($3·75) per ton; coke sells for $3·75 per ton; and gas for 2s. 7½d. per 1000, or 65 cents. The labour of retort men was 5s. 6d. ($1·37) per day of eight hours, and three men ran this setting, which was very fair for so small a works. This labour included handling coal from store to bunkers, and coke to yard by lift and overhead trestle.

St. Helens.

In the literature of the Glover-West system published in the United States the picture of the St. Helens works is among the prominent ones. St. Helens is the home of Mr. Samuel Glover, one of the patentees of the Glover-West system. St. Helens has a population of about 96,000; the make of gas in 1912 was 522 millions. The manufacture in the old settings was 10,500 cubic feet of 16½-candle power gas; while the verticals make 11,600 cubic feet of 15½-candle power gas. The law in the district calls for 14-candle power gas, in a No. 2 "Metropolitan" burner. Coal is about $2·50 per ton, and labour is about the same as around Manchester—$1·37 per eight-hour day.

When the plant had been in use about a year, the Gas Engineers' Association of the Manchester district were invited to hold their meeting at St. Helens, to inspect and criticize the new type of verticals—this was in October, 1909. Previous to the meeting many different kinds of coal had been used, and long tests were made under the inspection of impartial experts. The results obtained were very gratifying; the net results showing, with a poor local coal, 11,500 cubic feet of gas—575 B.Th.U., 14·8-candle power, or 29,700 feet per retort per day, and about 80,000 feet carbonized per man per day—one man for each shift. This particular coal cost $2 per ton, and was a mixture such as they could not use with economy in the horizontals. Since that time the plant had been doubled; and the results are about 120,000 cubic feet per man per day.

The results in bye-products are satisfactory. The coke is clean and grey, has a metallic ring, and is superior to the horizontal coke, and, as in many places, sells for more money than the coke from horizontals. The tar is thin and poor, but low in carbon; and my informants did not say but that they were able to use it. In many works it was mixed with a great quantity of horizontal tar, and they did not know much about it as a separate commodity.

Belfast.

At Belfast we met the Engineer, Mr. J. D. Smith, and his Superintendent, Mr. Stears, who showed us around the works—over the vertical settings and under them. A 2½-million plant was working with marked economy at twelve-hour shifts; the results being about 200,000 cubic feet per man per day. Belfast has a population of 250,000. They made 2500 million cubic feet in 1912; large days' outputs are 11 millions. Coke sells for $6·25 per ton; coal costs $4·50 per ton. They figure that their coal gas costs them 13 c. per 1000 feet—candle power of gas made in vertical retorts, 15½. The plant has been in use for a year. It is supplied with a modern conveyor for handling coal and coke, and a monorail device for distributing the coke in the yard.

Lurgan.

Lurgan is a little linen town with Mr. W. Tallentire as the Gas Manager. The plant was of 250,000 cubic feet capacity—here an elevator (or lift, as they always say in England) took the coal to the overhead bunkers, and also the coke to an elevated discharge in the yard. Two men seemed to be the only ones around—one for yard work and one for the setting; also, one man for the setting at night. Though the works are so small, the results per man per day are over 100,000 cubic feet. I did not meet a man more pleased with his verticals than Mr. Tallentire; he seemed to think there never was anything quite like them.

Birmingham.

Here we saw the first Woodall-Duckham plant in our travels. A 5-million plant had just been installed, and run under test for a few months. We struck the town the hottest day we experienced in England—87° and humid. The heat on the benches was fierce; and we were unable to judge of the fine points of that installation—our natural inclination for lower temperature overcoming our desire to investigate hot details. Birmingham had, however, other interests which attracted our attention; a Meriden silver manufacturer is in the business there.

London.

As previously stated, many of the works in the South of England which have adopted verticals have chosen the Woodall-Duckham system. We visited five or six plants in the South of England, and all were of this type. At the Kensal Green works, where the early experimental work was done, a 1 million cubic feet installation was seen—half of it working. Here, too, discarded devices were seen, as in Droylsden, near Manchester.

Tottenham.

At Tottenham, a 1 million setting was found, working on what we judged to be a very high-grade of gas coal, called Yorkshire peas. Results here were stated to be 15,000 cubic feet per ton, where 13,000 cubic feet per ton were obtained in the horizontal settings. These high results were partially offset by the B.Th.U. results, however, which were given as 509 to 521 gross and 457 to 473 net, with a candle power of 13·5. Plants in the London district run apparently on low candle powers. A candle power of 13·5, or 460 B.Th.U. net, is pretty poor stuff according to American ideas of candle power; for all tests in England are made on a No. 2 "Metropolitan" burner. Comparing it with our American burners, it reads 1-candle high on low-candle power readings, and nearly 2 candles high on high-candle power readings. If this is true, 13·5-candle power, "Metropolitan" No. 2, is about 12·5-candle power, American standard. One thing is certain. Gas of such low candle power must always be used with mantle burners; and that is the universal practice in and about London, where the candle power is so low and the cost per 1000 low also. I only saw one place in London where gas was being used in a batswing burner. It was the poorest gas I ever saw.

Luton.

At Luton, thirty miles north of London, a plant of Woodall-Duckham verticals of 500,000 cubic feet capacity was installed five years ago; later another similar size plant was added. When we arrived at the works, we found half the setting idle; the ironwork on top removed. This setting had been running for three years. The ironwork, of light material, had become warped and burned. Seven of the eight slots, made of small brick, were in perfect condition; the eighth showed a bulge near the top—say, 4 feet square. It was decided that the only repairs necessary were to replace the bulge with new brickwork; paint all the slots with Tamac (a liquid wash) to fill in the interstices of the brick, so as to present a smooth surface; put on new and heavier mouthpieces; and start the bench up for another two or three years' run. Tests made on the first setting showed as follows:

First six months,	12,300	cubic feet per ton—candle power (average)				16·6
Next four	,, 12,800	,,	,,	,,	,,	16·4

The results for the day previous to our visit showed 473,000 cubic feet through seven slots in the companion setting—one out for scurfing—which means 67,600 cubic feet per slot, or about 540,000 cubic feet per setting of eight slots, under ordinary working conditions, giving 16·2-candle power.

Tests on old-style horizontals were 11,300 cubic feet per ton; average candle power, 18·3. Coal used, Yorkshire nuts. Here the candle power was very high on both the horizontals and verticals as compared with those that prevailed in and around London. The town has a population of 52,000; output in 1912, 513 million cubic feet; price of gas, 45 c. per 1000.

Poole.

The real show-plant of the Woodall-Duckham system is at Poole, near Bournemouth. Here one of the patentees has charge, assisted by a corps of bright young men who superintend the different works. The retort-house at Poole is of I-beam and 2-inch "Hy-rib" concrete construction, quite expensive to build in this country, I believe—about the equal of a substantial brick building; but in England much less expensive than brick. Poole is on the bay or harbour. The weather is quite mild in winter; and, by keeping the exposed ironwork painted, this construction answers very well.

The vertical works consist of six settings, of four slots each, total capacity 1½ millions, making 12,400 to 12,500 cubic feet per ton of 14·5-candle power gas. The Beasley calorimeter shows a straight line on 500 B.Th.U. The coal used is Yorkshire nuts, and costs $4.25 per ton. The general price of gas is 62 c. per 1000 cubic feet. The Parliamentary standard is 15½-candle power; so they are obliged to make some water gas (about 40 per cent., when we were there) of 16½ to 17 candle power, and mix it with the coal gas to cover the law. They are also still making gas in horizontals; and the returns from this type are 11,500 to 11,600 cubic feet per ton of 14·2-candle power gas.

They are working the horizontals as hard as they can when the respective candle powers and makes are:

Vertical	14·5	candles	12,500 cubic feet
Horizontal	14·2	,,	11,600 ,,

Three men per shift of eight hours were handling this 1¼ million plant (1¼ million or five sets of slots in commission at the time of our visit), with results of 140,000 cubic feet per man per shift. There was one man on top; one man on bottom, handling coke; one man on the conveyor and outside coal. Their records show 13 lbs. of coke used for 100 lbs. of coal. They sell 11·4 cwt. of coke per ton of coal carbonized. This, they claim, is the correct way to figure coke sales; and they consider them good results.

Interesting details were observed at this plant—such as a Körting steam jet for scurfing the slots—said to be very efficient and quick in results. We saw, also, a Blachett washer for separating the coke from the screenings by the use of a long inclined cylinder and water under pressure. Though we did not see this working, we were told it was most efficient, and reclaimed all the fine coke from the water gas and horizontal clinker. The large pile of clean, washed coke not removed from the collection pit evidenced the truth of the assertion.

Bristol.

The last place visited was Bristol. Here the Woodall-Duckham Company were installing 32 slots in two settings of sixteen each; and, with a very poor local coal, these settings are to make 1½ millions per day.

English retort-houses of old horizontal through settings lend themselves very readily to vertical construction, being about 66 feet wide—wide enough to instal two lines of verticals with good floor-space between. The side walls are 12 to 15 feet high; and

only the roof of an old house has to be removed to make it ready for the new work. Such was the case at Bristol. The construction was proceeding rapidly on one setting of sixteen slots, in all stages of its construction resembling steps in partially completed work. It was interesting to watch the mason work as it progressed step-by-step from bottom to top. Here masons were paid 21 c. per hour, and time-and-a-half after 5 p.m. The day begins at 6 a.m. and ends at 7 p.m., with half-hourly and hourly intervals for meals.

Mr. Irving, the Engineer at Bristol, said they were longing for the time when these settings of 1½ millions and their duplicates would be completed, so that labour conditions might improve. On the old horizontals they were only able to make about 2½ million cubic feet per day with 150 men (three eight-hour shifts) or 16,600 feet per man. But he confidently expected to make with the verticals 3 millions per day, with 25 men, or 120,000 cubic feet per man; and from results in some other parts of England he will do it easily.

Bristol is a large place, and has three gas-plants. The population is 360,000. The output in 1912 was 12,900 million cubic feet. Gas is sold from 36 c. to 50 c. per 1000. With the local coal the horizontals make 10,000 cubic feet per ton carbonized of about 500 B.Th.U. gas.

Conclusion.

From general information obtained, and from a conversation in London with one of the prominent Scotch fire-brick makers, who had gone through the school and learned his lesson, I was convinced that we, in America, have something yet to learn on the subject of fire-brick for vertical settings. The few examples of different kinds of brick which I have seen in America, and their action in verticals, lead me to go slow in making a choice; for up to date every setting installed has some new kind or class of brick in it different from that of any other previously constructed. It took three years, at least, if not five, for the Englishman to get his brick right; and I think it will take some time before we get brick that will stand the extra heat required to carbonize our American coals. Progress is surely being made; and before another year has passed the materials in the settings now being constructed and under fire will have been proven good or bad. The representatives of the two English concerns on this side of the water are doing all they can to get the "bugs" out of the settings, and Americanize the equipments, so that they can be manufactured here at reasonable cost. The companies that are convinced that verticals are the coming thing, and can wait a year, will obtain a wealth of knowledge, and possibly save much money.

Garstang Gas Company's Memorandum.

In the Chancery Court, at Manchester, last Tuesday, before the Vice-Chancellor (Mr. Dudley Stewart-Smith, K.C.), Mr. Firth presented a petition from the Garstang Gas Company for the alteration of their Memorandum of Association, in order to secure power to supply gas to the inhabitants of Claughton. The existing Memorandum of Association, made thirty years ago, he said, gave power to the Company to conduct operations in certain townships; and in those days it was not the practice to have such extended memoranda as were now in use. Before granting a Provisional Order to enable the Company to carry on operations in Claughton, the Board of Trade required that this application should be made. The locality was about half way between Preston and Lancaster, and with the exception of the town of Garstang was of a rural character. The townships already embraced were, perhaps, more populous than the one it was now proposed to add. The chief difficulty was that the Company could not carry on operations within the present area without going along the road in the township of Claughton; and it was with the object of having power to do this that the extension was proposed. All the parties concerned were in agreement; and as there was no other gas company for several miles the question of competition did not arise. The Vice-Chancellor granted the petition.

St. Helens Water Deficit.—It was stated at a meeting of the St. Helens Water Committee last Wednesday that there would be a deficit of £1095 on the year. It was decided to increase the charges to 6 per cent. for domestic, and to 7d. per 1000 gallons for trade, supplies.

Gas v. Electricity at Ardee.—A special meeting of the Ardee (co. Louth) Town Commissioners last week discussed a proposal of the Ardee Gas Company to supply gaslights of 90-candle power for £2 per lamp per annum, and a rival proposal by Mr. M'Keever to instal an electric plant and furnish electric lights of 50-candle power at 30s. per lamp, 100-candle power at 50s., and 200-candle power at £3. The Gas Company are the present contractors. In the result, the Council were equally divided; and the Chairman (Mr. M'Donald) declining to vote, the matter stands over for further consideration.

Public Lighting in West Ham.—At the last meeting of the West Ham Council, the Highways Committee reported having had under consideration alternative tenders from the Gaslight and Coke Company for public lighting. They had decided to accept the tender for the conversion of not less than 2500 of the existing gas-lamps from the upright to the inverted system (by fitting in new reflectors and two medium "Nico" burners, giving together a light per lamp of 120 candles), and for the lighting, extinguishing, and maintenance of the lamps for five years at the rate of £2 8s per lamp per annum, with an option of renewing the agreement for a second period of five years at £2 3s. per lamp per annum—the lighting and extinguishing to be by means of automatic apparatus. The number of lamps at present maintained by the Company is 2749, and the price is £2 11s. 1d. per lamp per annum.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Midland Association Topics.

Sir,—In reference to the remarks of "Modus Operandi" I have pleasure in replying as follows.

I found that working in a direct rotation sometimes had the effect of showing a dirty test, which on the rotation being reversed—viz., making inlets into outlets—and working in this manner for a few days, cleared the box. My theory for this was that the top layer of purifying material had become caked and inactive. The action of reversing the flow of the gas, and applying a little steam, broke up the top layer into smaller particles, and made it possibly more porous.

The method of changing the inlets into outlets and *vice versâ* was quickly done—by operating a four-way valve fixed immediately underneath the Weck valve.

I am strongly of opinion that a catch-box is most certainly essential—more especially where the purifiers are on the small side. I have known of instances where, when only working with four boxes on the reversing principle, it has happened that (say) two of the boxes have shown signs of fouling, and to change the position of the boxes as to rotation, it is almost impossible to do so without traces of H_2S going forward. Hence the advantage of having a catch-box.

I quite agree that a compressor on a works would be an advantage for the admission of air and other purposes; but not having a compressor on the works, and embarking upon a new scheme, at first practically experimental, a small blower was the cheapest, and at the same time it was quite efficient for the purpose.

The cause of using coke breeze was purely one of having no alternative, owing entirely to local circumstances.

Sawdust coarse enough, or wood chippings, were unobtainable in the neighbourhood. The nearest place that I could obtain the coarse chippings (wood) was Preston; and the price of same, and railway rates, made the cost prohibitive—viz., 19s. Therefore I was practically left no other alternative but to use coke breeze and dust, the size of which was material that would pass through a ⅜-inch riddle. Personally, I do not think it would be wise to use anything larger. I have heard of trouble where large coke has been used.

I should have thought that the shavings spoken of by "Modus Operandi" would have been too light to mix with Lux. I take this opportunity of thanking him for the hint, which I shall most certainly try shortly.

I might mention that, when emptying a purifier, I found that the material that was lightened with sawdust was not so caked as that lightened with coke breeze and dust. I certainly prefer the sawdust or wood chippings, if obtainable locally at a reasonable price.

W. J. Rendell Baker.

Mansfield Gas and Water Works, March 14, 1914.

Sir,—In reply to the query of the author of "Works Topics," I may say that we work eight-hour charges of 8 cwt. per charge. The retorts are charged at 6 a.m., 10 a.m., and 1.30 p.m.; and there is the same routine at night. The last charge is commenced half-an-hour earlier, in order that the stokers can be released immediately the charge is completed. This takes an hour in the winter, and rather less than half-an hour in the summer. We do not get any bad results in charging at four-hour intervals. I have tried twelve-hour charges, with two eight-hour shifts, and find there is little or no difference in the ultimate results.

W. H. Adams.

Bilston, March 14, 1914.

The Purifying Arrangements at Malvern.

Sir,—In view of the prominence given to Mr. W. J. Rendell Baker's account of his purifying arrangements at Malvern, and the further reference to the matter by "Modus Operandi" in your last issue, I am sure it can only be your great interest in the welfare of the gas industry that has allowed undue attention in the comments being given to a special purifying material rather than to the chief factors, which are the admirable arrangements of valves and the rotation methods adopted, and also the large area of the boxes.

There are other oxides obtainable, particularly natural bog ore, that give results equal to, and indeed surpassing, those obtained by Mr. Baker; and it must not be overlooked that heavy oxides which require the admixture of lightening materials have drawbacks. Especially is this so when coke breeze is used, on account of the serious depreciation in the value of the spent material. Hence the use of a good porous natural bog ore—selecting only such as contain the ferric oxide in a thoroughly hydrated condition, a suitable proportion of organic matter, and a minimum of silica—is strongly to be recommended.

First Dutch Bog-Ore Company, Limited.

Wood Green, N., March 13, 1914.

Liability for Damages to Public Lamps.

Sir,—Recently we have had a series of breakages in public lamps by horses and carts. According to contract arrangements with the respective public authorities, we are to maintain such public lamps. Therefore, under section 20 of the Gas-Works Clauses Act, 1847, we have rendered the full cost against the owner whose horse or cart did the damage, but we have been told by them either "that they could not discover any negligence on the part of their employee, stating that the side-slip was a pure accident, and that they cannot see that they could have done anything to have prevented it, and therefore cannot accept liability," or "from the evidence there does not appear any liability attaching to them. Every care was taken, and the damage is due to a cause over which the driver had no control, and therefore cannot admit liability, and are quite satisfied that no common law liability attaches to the persons in the matter."

In view of the apparently sweeping powers ascribed to gas companies

as set out in the above-mentioned section of the Gas-Works Clauses Act, 1847, I should like to ascertain the true position we—a statutory company—stand in. Have we to recognize that consideration should be given to the common law aspect in such matters, or is the above section sufficient for the intended purpose?

I might say that hitherto we have always been able to obtain payment in full. But recently the argument of "common law" has been introduced; and in one or two cases the parties have offered to pay half the cost, at the same time stipulating "without prejudice."

For any information giving a gas company's legitimate position, and [or] any legal decisions in such cases, I should be extremely obliged, and should be glad for any assistance through the columns of your valuable paper.

March 13, 1914. INQUIRER.

Loans for Mannesmann Tubes.

In explanation of the reported decision [*ante*, p. 675] of the Local Government Board to allow a loan to the Tredegar Urban District Council "on condition that no payments be made on Mannesmann steel tubes for mains," the following letter has been sent to the Press, signed by Mr. O. Altmann, the Commercial Manager of the British Mannesmann Tube Company, Limited.

In reference to the statement that has appeared in the Press concerning an alleged embargo of the Local Government Board on Mannesmann tubes, will you kindly allow space for the following explanation?

The Local Government Board is accustomed to grant loans to local authorities for their water and other undertakings on the recommendation of its engineering department, provided the money is applied for the purpose for which it is specified. The last loan sanctioned for the Tredegar Council was, we understand, for purposes other than the provision of steel mains, whereas part of a previous loan had been delegated to the laying of Mannesmann tubes. In order to keep the items quite distinct, the Local Government Board's letter contained the following clause: "The loans are approved on condition that no payment be made on Mannesmann steel tubes for mains 'out of the amount now sanctioned.'" The last six words were omitted in the Press reports; hence the impression that Mannesmann tubes were objected to by the Board. The addition of these words now explains the whole position.

As a matter of fact, the Local Government Board are perfectly willing to grant loans for Mannesmann steel tubes, and have done so on every occasion when desired.

High-Pressure Systems.—A correspondent has sent us an inquiry as to whether we can provide him with a complete list of towns in which a high-pressure gas supply system exists. There is no compilation giving such information; and if readers will furnish the names of their towns possessing high-pressure mains, we will endeavour not only to satisfy our correspondent's wish, but subsequently to publish the particulars for general interest.

Street Lighting in Lambeth.

The Lambeth Borough Council, at a meeting on Friday last, adopted the estimates of the Lighting Committee for the financial year 1914-15. The sum required was £13,150 for the lighting, extinguishing, and maintaining of the public lamps; £250 for new lamps and removals; and £10 for miscellaneous expenses. The first item (£13,150) includes £10,075 for the South Metropolitan Gas Company; £2148 for the Gas Light and Coke Company; and £648 for the South Suburban Gas Company. In 1911, the Council decided to convert 602 lamps from No. 2 upright to No. 2 inverted at 9s. per lamp; the expenditure being spread over a period of three years. The estimates include the sum for the third year. Alderman Evans, the Chairman of the Finance Committee, said the estimates were slightly below the average for the past thirteen years; but this was due to the improved methods adopted for street lighting, which had proved more economical.

Fire in an Old German Church.—According to the Berlin correspondent of "The Times," the west tower and organ of the beautiful old Thirteenth Century Minster at Neuss, in Rhenish Prussia, were destroyed last Saturday by fire. It broke out early in the morning, and seems to have been caused by a short-circuit in the electric machinery for ringing the bells. It was discovered about 6.30 a.m. Mass was being celebrated, when suddenly all the lights went out, and a loud report was heard. The vergers ran up into the tower and found the bell-chamber all ablaze. The local brigade could not make any headway against the fire; and before help could arrive the tower was a sheet of flame. It soon fell in, and the bells crashed through the vaulting of the roof on to the organ; only the outside walls of the tower being left standing. The damage is estimated at £10,000.

Novel Scheme for Smoky Manchester.—A novel scheme has been set on foot by the Statistical Sub-Committee of the Manchester Sanitary Committee for arriving at the evils of the smoky atmosphere of the city. A list of questions has been prepared in the form of a circular; and these are to be sent out (with stamped addressed envelopes) to a large number of residents, employers, and hotel keepers. The questions are grouped under two heads: Personal, in so far as they relate to men; impersonal, in so far as they relate to households, workshops, factories, warehouses, retail shops, schools, hotels, hospitals, and gardens. In all cases an estimate will be asked for as to the effect of the smoky atmosphere upon the belongings of individuals and the property of hotels or institutions. Information has already been obtained by the Sub-Committee as to the charges that fall on one of the biggest city hotels in keeping the linens and hangings clean, together with a comparison with a similar class of hotel in the clearer atmosphere; and the extra cost is said to be stupendous. Similar revelations are expected in the case of institutions and hospitals.

REGISTER OF PATENTS.

Vertical Retorts.

DRAKES, LIMITED, and DRAKE, W. A., of Halifax.

No. 4104; Feb. 18, 1913.

The patentees propose the construction of extensions to the outlets of vertical retorts, whereby the heat radiating from the coke being discharged is utilized for heating air that is subsequently fed to, so as to support combustion within, the chambers in which are the retorts.

It is intended by the inventors to make use of an extension from the lower end of each retort through which the coke is discharged; and they construct a shield or wall to encircle the extension so that a cavity is formed entirely around each extension. The structure surrounding the retort is built upon supports or pillars (of well-known formation), which permit air to freely circulate around the walls of the extensions from the lower end of the retort and, passing vertically therefrom, to enter cavities in the structure surrounding the retort above. In all cases when series of retorts are in one structure, each retort has its extension and separate shield or wall.

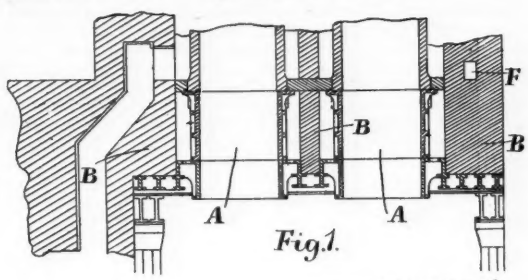


Fig.1.

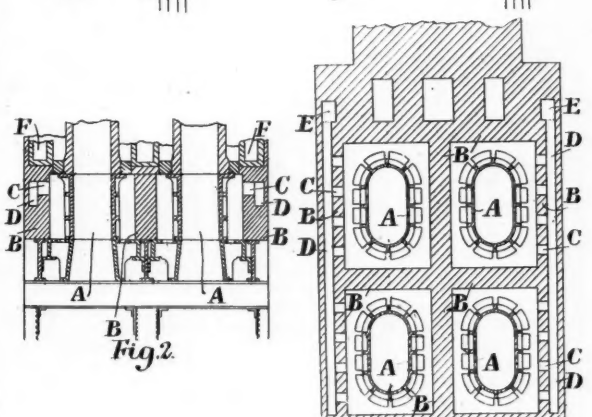


Fig.2.

Fig.3.

Drake's Vertical Retort Extension.

Fig. 1 is a longitudinal section of sufficient of the retort to illustrate the invention; fig. 2 a vertical section; fig. 3 a sectional plan.

Extending parts A are fixed to the lower ends of the retorts in such a manner that they project beyond the setting and are open to the atmosphere. Around the extensions are walls B, entirely surrounding the outer vertical surfaces while yet leaving open spaces between the lower edges of these walls and those of the extensions. Cavities are thus formed entirely around the extensions; and by having outlets or ducts C near the upper ends of the extensions, air is induced to flow through the openings leading to the cavities, along the outer vertical walls of the extension, passing through the ducts, flowing along the passages D, rising through the ducts E, and travelling through other passages F (at the upper ends of which are dampers to control its flow) to support combustion within the chambers in which the retorts are situated and which entirely encircle the retorts. The inrushing air is thus made to absorb the heat radiated by the walls of the extensions (each of which has its own supply of cold air), "so that, in addition to keeping the same cool, it enables the heat otherwise lost to be usefully employed; and this inrushing air is not controlled until after it has passed beyond the cavities surrounding the extensions."

The retorts and the structures surrounding them, including the extensions beneath the retorts, are all built upon pillars or supports, as usual, so as to leave the space beneath completely open to the atmosphere—"thus affording perfect freedom for the currents of air which flow to and enter the openings."

Manufacturing Sulphuric Acid from the Sulphur Compounds of Ammonia Freed Coal Gas.

MACKENZIE, J., of Middlesbrough-on-Tees.

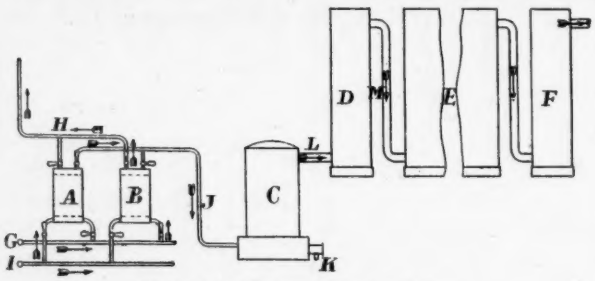
No. 4770; Feb. 25, 1913.

Processes have been proposed, the patentee mentions, for the purpose of combining the sulphur compounds contained in coal gas with the ammonia also contained in the gas, to form sulphate and sulphate of ammonia—notably as described in Burkheiser's patents Nos. 20,920 and 21,763 of 1908, also No. 17,359 of 1910.

The present invention has for its object the manufacture of sulphuric

acid direct from the sulphur compounds contained in the coal gas, from which the ammonia has previously been extracted; and the manner in which the patentee proposes to carry out his invention is as follows: In coke-oven or ordinary gas-works plants the crude gas, after passing through the usual cooling, condensing, scrubbing, and ammonia absorbing apparatus, is (as is known) led through a series of oxide of iron purifiers for the purpose of absorbing the sulphur compounds, and so that when one or more of the purifiers is charged with the sulphur compounds, arrangements can be provided for cutting these out of the crude-gas circuit, and submitting them or it to external heat and the passage of heated air, for the purpose of oxidizing the sulphur compounds and converting it into SO_2. This SO_2, it is now proposed, should be conveyed to a "contact apparatus," somewhat in the form of an iron-cased furnace lined with refractory brickwork and packed with burned pyrites to form the contact mass, which is kept at a moderate red-heat—about 700° C. Part of the crude gas can be used for this purpose. The SO_2 is drawn through this hot contact mass, along with a plentiful supply of air, by means of a fan; and in its passage through the mass the SO_2 is converted to the extent of 25 to 45 per cent. of its volume into SO_3. The mixture of SO_3 and the remaining SO_2 are passed through a tower (like a Glover tower in ordinary acid plant) down which sulphuric acid and sufficient nitric acid are fed to convert the remaining SO_2 into H_2SO_4. The gas after this passes through an ordinary small sulphuric acid chamber set with an absorbing or Gay-Lussac tower at the end, so as to absorb and collect the nitrous acid, which is returned to the Glover tower for denitration and further use in oxidizing fresh SO_2 to H_2SO_4 in the usual way. The necessary moisture is supplied by water or weak acid sprays or by steam in the chambers in the usual way.

Apparatus for carrying out the invention is diagrammatically illustrated—showing only two oxide of iron purifiers, although more may be used.



Mackenzie's Sulphur Absorption Process.

A B are two oxide of iron purifiers; C is a contact furnace filled with lump burnt pyrites in cubes of about 2 inches; D is a Glover tower; E is a broken elevation of a sulphuric acid chamber; and F is a Gay-Lussac absorbing tower for the nitrous acid.

The coal gas, after leaving the ammonia scrubber, enters at the pipe G, passes into the purifier B, and, after giving up the sulphur compounds to the oxide of iron it contains, passes through the pipe H as purified gas to be used in ovens or boilers, &c. The purifier A is supposed to be already saturated with sulphur compounds, and the hot air for driving off the sulphur and regenerating the oxide of iron enters at the pipe I, passes through the oxide of iron, and carrying the converted SO_2 through the pipe J into the lower part of the contact furnace C. There is a combustion chamber directly under this furnace, and the crude gas used for the purpose of heating the pyrites lumps enters at the burner K, along with the extra air necessary for oxidizing the SO_2 into SO_3 in the contact furnace. The converted SO_3 and the remaining SO_2, and all the products of the combustion of the crude gas, pass from C through the pipe L into the bottom of the tower D, which is packed with refractory acid-proof material. The mixed gases pass up D, meeting sulphuric acid, where all the SO_3 is absorbed and the bulk of the SO_2 converted into H_2SO_4 through meeting sulphuric acid containing nitrogen compounds and becoming oxidized. Any remaining SO_2 passes through the pipe M into the chamber E, and is treated as in an ordinary sulphuric acid plant—the excess nitrous compounds being absorbed in the Gay-Lussac tower F for use again in the tower D. The sulphuric acid made in excess of that necessary for working the plant is taken away from the bottom of the tower D, or the chamber E, or from both, and used for any required purpose. When the sulphur compound has been driven off from the purifier A, and B has become saturated with sulphur compounds, the cocks are changed, so that A is in a position to receive the crude gas, and B to be regenerated by admitting the hot air from the pipe I.

Means for Lighting Incandescent Gas-Burners.

MOORE, A. B., of Mansfield.

No. 9825; April 26, 1913.

This invention has for its object the production of a float valve for automatically lighting and extinguishing gas-burners by variation of the pressure in the main, in which the gas inlets and outlets to the inside of the float are connected above and below a closure in a central pipe, and so arranged in connection with cowls carried by the float that the float valve can be used in connection with upright or inverted incandescent burners; also the combination with a group of burners fitted with the float valves of an arrangement of pipes and valves whereby the whole or any number of the burners in the group may be simultaneously lighted and extinguished.

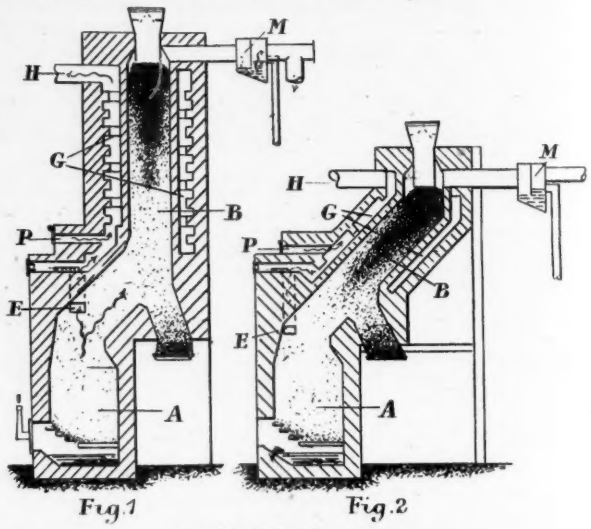
When the valve is to be used on each of a group of burners, and it is desired to light and extinguish some of the burners at one time, or to light and extinguish all the burners at the same time, the floats of some of the burners are more lightly weighted than those of the others, and the gas-main is provided with a three-way valve. When the valve is in one position, the full pressure of gas passes to all the burners; and when turned to another position, the gas passes through a reducing valve, and only the burners with the lighter-weighted floats are supplied with gas. The gas for the bye-pass or pilot light burners is supplied by a pipe which leaves the main below the three-way valve and enters the main above the valve. This pipe is preferably fitted with a stop-valve and a reducing-valve, so that the pressure of gas supplied to the bye-pass or pilot-burners is never sufficient to raise the floats of any of the burners. When it is required always to light and extinguish all the burners at the same time, all the floats are equally weighted, and the reducing valve is dispensed with.

Distilling and Gasifying Solid Carbonaceous Matter.

LEWIS, G. P., of Taly Cafn, Denbighshire.

No. 4572; Feb. 22, 1913.

This invention relates to means of distilling and gasifying solid carbonaceous matters, such as coal, shales, lignite, bitumen or bituminous earth, peat, wood, bark, nutshells, oil nuts, and the like.



Lewis's Retort Generator.

Fig. 1 is a vertical section of the retort generator to be employed with a vertical retort section; and fig. 2 with an inclined retort section.

The work of primary distillation and gasification is effected in combined vessels; the upper portions B acting as distilling vessels (referred to as retorts), while the lower portions A act as gasifiers or gas producers (referred to as generators). Means are provided so that a proportion of the coked fuel may be withdrawn when the raw fuel is marketable coke. The retort may be either vertical or inclined at such an angle as will permit of the fuel descending by gravitation; while "with some classes of fuel it is necessary to have an internal taper, so that the matter undergoing distillation may descend with ease and regularity." The retort is surrounded by heating flues G, for the purpose of external heating by means of the sensible heat in the generator gases which are admitted through the flue E. This heating effect is supplemented, when necessary, by promoting slight combustion by admitting a small quantity of air through the air-port P. The gases leave the flue by way of the pipe H, but may be subsequently admixed with the rich gases leaving the retort if desired.

The lower portion of the generator acts as a gasifier in the well-known way; steam and air being admitted below the grate as convenient. A large proportion of the gases generated therein are allowed to ascend through the heated carbonaceous matter undergoing distillation in the retort—thereby effecting the double purpose of heating the descending fuel and sweeping out the rich hydrocarbon gases as quickly as possible, and thus minimizing any breaking-down actions.

Automatically Cutting-off the Discharge of Gas from Gasholders.

HANAPPE, E., of Brussels.

No. 15,271; July 2, 1913.

This is a safety device or check valve for use where the supply of gas to the discharge pipe of the holder needs to be automatically cut off by means of a water seal or hydraulic joint when the pressure of gas in the holder falls below a certain point.

The safety device comprises a floating member, provided with a vertical tube, closed at its upper end, and capable of being fitted over the upper end of the discharge pipe of the holder so as to leave an annular space (between it and the pipe) normally in communication with the interior of the holder through openings provided at the lower part of the tube. The device is completely independent of the holder, or connected to it and raised by it.

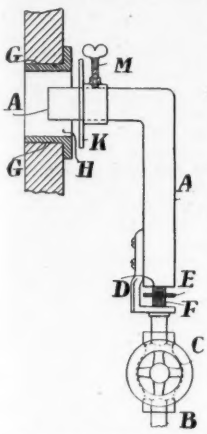
Bunsen Burners for High-Pressure Gas.

FLETCHER, RUSSELL, AND CO., LIMITED, and FLETCHER, T. W. of Warrington.

No. 15,990; July 11, 1913.

This invention has special reference to burners provided with means for obtaining a regulated secondary supply of air. In burners of this

kind, the patentees remark, it has hitherto been proposed to provide a sleeve or casing surrounding the burner or mixture pipe, and into which the latter opens with an angularly-adjustable hit-and-miss disc or sleeve valve, whereby a regulated secondary supply of air may be drawn into the sleeve or casing by the mixture issuing from the burner or mixing pipe. According to the present invention, however, it is proposed to mount on the burner or mixture pipe a disc adapted to be axially adjusted relatively to the surrounding sleeve or casing, and so regulate the secondary air drawn in.



Fletcher, Russell, and Co.'s High-Pressure Bunsen Burner.

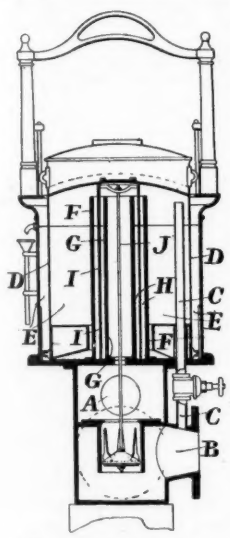
A is the burner or mixture pipe to which gas is supplied by the pipe B and valve C; air being drawn in at D by the gas, and being regulated by a disc E screwing on the nipple F (all as usual). In order to provide a secondary supply of air when the primary supply admitted at D is insufficient, the aperture G in the wall of the furnace, into which the burner A projects, is enlarged so that an annular space H results around the burner. As the mixture issues from A, it draws in a secondary supply of air through the space H, the quantity of which can be regulated by a disc K axially adjustable on A for the purpose of adjusting the inlet to the space H.

Gas-Governors.

JAMES MILNE and SON, LIMITED, and FOX, T., of Edinburgh.

No. 10,956; May 9, 1913.

Under this invention the governor is provided with an outer bell which works in a comparatively large liquid seal, while the inner bell depends from the dome of the outer bell and works in a comparatively small seal. The two seals are separated only by means of a thin annular wall of sheet metal; while they communicate with each other by means of one or more holes in the wall, "so that any oscillation set up in the sealing liquid of the compensating bell by the ungoverned gas is prevented from interfering with the accuracy of the main or regulating bell."



Fox's (Milne and Son) Gas-Governor.

A is the pipe connection for the ungoverned gas; B the connection for the governed gas; while C is the usual pipe by means of which the governed gas communicates with the interior of the main regulating bell. This bell D (of the float type) works in an annular liquid seal E, and secured on the fixed bottom of the liquid chamber are two concentric walls F G, of cylindrical form, and having between them an annular space H to serve as a liquid chamber for the seal of the compensating bell I, which depends from the top of the main regulating bell D. The outer wall F forms a division wall between the seal E for the regulating bell D and that for the compensating bell I; and provided in the wall is an aperture (or apertures) by means of which the liquid in the outer and inner seals communicate with each other. The rod J connecting the top with the governor valve is arranged centrally within the inner wall G; and the bottom of the liquid chamber is provided with an opening for the passage of the rod—the arrangement being such that the opening also permits of free communication between the interior of the compensating bell I and the ungoverned gas.

Gas-Heaters.

JONES, E. C., and PEARSON, J., of Toronto.

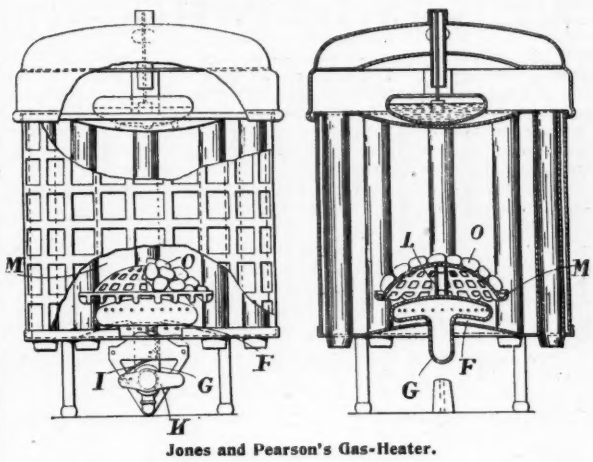
No. 12,000; May 22, 1913.

This heater consists of a casing having a reticulated front, a top, and a bottom "peculiarly constructed to maintain the delivery of atmospheric air to the burner."

As shown, the burner is of hollow formation and imperforate, except as regards the gas outlets arranged around its rim. It is supported above the casing bottom to form an air-chamber F between the burner bottom and the casing bottom—the burner bottom acting as a baffle to prevent the further upward course of the air in the line of admission, and to direct it laterally in all directions beyond the perimeter of the burner, so as to provide "a sufficient and even supply of oxygen to all the gas outlets for oxidizing the gas emitted and creating a non-luminous flame completely around the burner, which flame is the manifestation of complete combustion."

To support the burner above the casing bottom, there is a gas inlet pipe G, fitted on to which is a pyrophoric igniter I, actuated by the turning of the lever K when turning on the gas. The top of the burner is provided with a standard L to support a reticulated concave-convex grate M, on which are placed "refractory heat distributors" O.

The action is as follows: The lever K being operated the gas immediately flows through the inlet pipe G to the burner, heating the



Jones and Pearson's Gas-Heater.

distributors O, which, "in turn, radiate the heat evenly to all parts of the casing, from which the heat is diffused to the surrounding atmosphere." The "burnt" gas from the burner ascends through the heater casing and passes through flues (not shown) into the hollow part of the cover, to escape through the outlet flue above.

APPLICATIONS FOR LETTERS PATENT.

5307.—BLANCK, F., "Gas-lamps." March 2.
5327.—FOX, L. M., "Gas-burners." March 2.
5328.—DIETRICH, R., and MEYER, H., "Clearing gas-pipes, &c." March 2.
5331.—SOUTHEY, A. W., "Production of gaseous fuel." March 2.
5386.—BALCON, P. C., and ASHMORE, BENSON, PEASE, AND CO., LTD., "Purification of gas." March 3.
5427.—LIESE, H. M., "Measuring and controlling the pressure of gases." March 3.
5438.—JUNKERS, H., "Water-heaters." March 3.
5533.—FORWOOD, G. F., and ROSTIN, H. P., "Gas-igniter." March 4.
5590.—WEATHERHEAD, F. W., "Generating acetylene." March 5.
5621.—FEDELER, J. H., "Separating heavy particles floating in gas." March 5.
5626.—LAMKIN, A. E., "Igniting gas." March 5.
5662.—HUGHES, G. A., "Suspension of lamps." March 5.
5669.—THOMAS, F. W., "Mantles." March 6.
5730.—STRACHE, H., "Producing combustible gases." March 6.
5731.—HEUSSLER, J, "Meters." March 6.
5734.—PEARSON, R., and CHALK FUEL POWER GAS AND BYE PRODUCTS CORPORATION, LTD., "Manufacture of lime and fuel gas." March 6.
5750.—ILSLEY, W. E., "Acetylene generators." March 6.
5764.—HOECHLIN, D., "Purifying and treating town gas." March 6.
5781.—CARMICHAEL, D., and MARR, A., "Acetylene plant." March 7.
5874.—JACKSON, T., and RAMSEY, A., "Meters." March 7.

Southend Corporation and the Gas-Works.

At the end of a private sitting, the Southend Corporation decided, by a narrow majority, not to proceed with the proposal to promote a Bill for the purchase of the gas-works. The question arose upon a report by the Law and Parliamentary Committee, who stated that, as instructed by the Council, they deposited a petition in opposition to the Company's Bill. With regard to a prayer of the petition that Parliament should postpone the operation of the Bill in order to give the Corporation an opportunity of applying next session for authority to purchase the undertaking of the Company, and that there should be no enhancement of the price payable therefor in consequence of the passing of the Bill, the Committee instructed Mr. E. H. Stevenson to report to them upon the proposal, in order that the Committee and the Council might be fully advised. It was undesirable that the contents of Mr. Stevenson's report should be made public at this stage; and the Committee therefore asked the Council to sit in private, when the report would be laid before the members and a statement made on behalf of the Committee in regard to matters arising out of the proposals of the Bill and the Corporation's petition against it. The Committee also reported that it was recently decided by the authorities of the House of Lords that the Bill would not be considered by a Committee until April; but it had somewhat unexpectedly been assigned to a Committee who would commence to sit on March 10, and it had therefore become necessary that the Council should at once decide whether or not they would ask Parliament to postpone the operation of the Bill in accordance with the petition.

Walsall Gas-Works Profits.—The annual balance-sheet of the Walsall Corporation gas undertaking shows a net profit for the year ended Dec. 31 of £6098, being a decrease of £3391 as compared with the previous year. The reduction is attributed mainly to an increase of £2654 in the cost of coal; while the amount received for the sale of residual products was less by £620. It is also pointed out that a reduction in the price of gas supplied for power purposes recently came into effect. It is proposed to transfer £6000 to the borough fund in relief of the rates, as against £7000 last year. The Committee have decided that £8609 expended in providing a carburetted water-gas plant shall be charged to capital, and repaid in ten years.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress has been made with Bills:—

The Glasgow Corporation (Water, Tramways, &c.) Bill was presented and read the first time.

Bills read the second time and committed: Bristol Water; Mexborough Water; Skegness Urban District Council; West Gloucestershire Water.

The Standing Orders Committee reported that the Standing Orders not complied with in respect of the Edenbridge Gas Bill ought to be dispensed with, and the Bill allowed to proceed.

A petition for additional provision, presented by the promoters of the Hightown Gas and Electricity Bill, was read, and referred to the Examiners.

On the order of the House, an amended petition was presented by the Failsworth Urban District Council against the Manchester Corporation Bill.

The Mexborough Water Bill and the Mexborough Urban District Council Bill have been referred to the Select Committee already appointed on the Llanfaelog Water and other Bills, whose names were given last week.

The Southbank and Normanby Gas Company Bill, Whitwell Gas Bill, Rhymney and Aber Valleys Gas and Water Bill, Skegness Gas Bill, Skegness Urban District Council Bill, and Leighton Buzzard Gas Bill have been referred to a Select Committee consisting of Lord Haversham (Chairman), Earl Craven, Lord Templemore, Lord Abinger, and Lord Oranmore and Browne; to meet on Thursday.

Hightown Gas and Electricity Bill.

By the courtesy of the Agents, Messrs. Butterworth and Co., we have been enabled to obtain a copy of the additional clause and amendments with regard to this Bill, mentioned above. Power is sought to purchase by agreement the petrol air gas plant and mains of the Hightown Land Development Company, and to dispose of or hold the mains, pipes, and other works for any purpose except the making, converting, or storing of gas or residual products.

HOUSE OF COMMONS.

The Market Rasen Water Bill was read the second time and referred to the Examiners.

The London County Council (General Powers) Bill was read the second time and committed.

The Ashington Urban District Council Bill was reported with amendments.

A petition was presented against the Northwich Urban District Council Bill by the Congleton Rural District Council, who did not pray to be heard.

The following petitions were withdrawn: Essex County Council against the Southend Gas Bill; Bradford Corporation against the Ossett Corporation Bill; Alsager Urban District Council against the Kidsgrove Gas Bill; Lancashire and Yorkshire and London and North Western Railway Companies against the St. Anne's-on-the-Sea Improvement Bill; Derbyshire County Council against the Riddings District Gas Bill.

The Select Committee on Standing Orders reported that the Standing Orders ought to be dispensed with in the case of the Sheffield Corporation Bill, on condition that certain words in clause 49 [which refers to local Acts and bye-laws] be struck out.

The Kidsgrove Gas Bill has been referred to a Select Committee consisting of Sir W. Howell Davies (Chairman), Mr. Alan Sykes, Mr. Black, and Mr. Lyttleton, to commence sitting to-day, March 17.

Skegness Urban District Council.

The Standing Orders Committee of the House of Commons last Tuesday decided to dispense with the Standing Orders and allow this Bill to proceed. The Bill has already passed the Standing Orders Committee of the House of Lords [*ante*, p. 664].

Nationalization of Coal Mines.

In the House of Commons, Mr. Stephen Walsh gave notice of a Bill "to nationalize the coal mines and minerals of the United Kingdom, and to provide for the national distribution and sale of coal."

COURT OF REFEREES.—Thursday, March 12.

(*Before Mr.* WHITLEY, *Chairman, Mr.* E. MOON, K.C., *Speaker's Counsel, Lord* ROBERT CECIL, *Sir* PHIPSON BEALE, K.C., *Mr.* MOONEY, *Mr.* M'LEAN, *Mr.* WHITE, *and Mr.* ROBERTS.)

ALLIANCE AND DUBLIN GAS BILL.

In this Bill, in which powers for the supply of electricity are sought, the *locus* of the Dublin Corporation was objected to by the promoters—the Alliance and Dublin Consumers' Gas Company.

Mr G. J. TALBOT, K.C., appeared for the promoters; and Mr. LYNDEN MACASSEY, K.C., represented the Dublin Corporation.

Mr. MACASSEY asked for *locus* to appear against the Bill under Standing Order No. 134*a*; failing this, under Standing Order No. 134. The promoting Company supplied gas in a very large area, including Dublin; and under the Bill it was proposed to supply electricity in the districts of Kingstown, Blackrock, and Dalkey, and to apply the capital of the Company already authorized, but not raised, to this purpose. The Bill also authorized the raising of additional capital for electricity purposes, to be charged primarily upon the proposed electrical undertaking but collaterally upon the gas revenue. The ground upon which the Dublin Corporation applied for *locus* was that the district of the Corporation would be injuriously affected by the Bill—firstly, because the Company was established for the purpose of supplying gas; secondly, it was alleged that the Company now manage their affairs in Dublin so badly that they should not be entitled to go to Parliament to seek to establish a new concern in the form of an electricity undertaking; and, thirdly, that under a clause in the Company's Act of 1909 it was expressly provided that no gas capital should be devoted to electricity purposes. He also claimed a right to be heard under the terms of the sliding-scale. As the Bill stood, it would be possible that profits which would otherwise go to reduce the price of gas to the consumers in Dublin would be devoted to paying a dividend upon the electricity capital; and this would inevitably postpone any reduction of gas prices in Dublin. Starting from the year 1881, when Standing Order No. 134*a* was first introduced, he did not know of a single case where any local authority within the area of supply of a gas or water undertaking had been refused *locus* against a Bill, even where the local authority had merely alleged that its district would be injuriously affected. He had gone into the matter with much greater particularity than this, and found it difficult to appreciate why *locus* in this case was objected to. There was an unbroken list of cases in his favour from 1881 onwards.

Mr. MOON pointed out that the Court must be satisfied that the allegation of injurious affection was not a purely imaginary one.

Mr. MACASSEY said that under Standing Order No. 134 this was so; but he was not so sure it was so under Standing Order No. 134*a*.

The CHAIRMAN: I think we are with you that a local authority within the area of supply of a gas or water undertaking is entitled to *locus* under Standing Order No. 134*a*, if it alleges that its district will be injuriously affected.

Mr. TALBOT, for the promoters, said that this followed from the wording of the Standing Order where the Bill related to the lighting or water supply of the district of the petitioning local authority. This Bill, however, did not relate to the lighting of Dublin, nor to the raising of capital for the City of Dublin. He disputed the technical right of the Corporation to *locus*. Furthermore, he had not heard from the argument of Mr. Macassey the nature of the mischief which was apprehended to the City of Dublin from the granting of the powers under the Bill. The real animus of the Corporation against the Company—which his clients felt was held unreasonably—was that they did not think the Company were doing their duty, and charged too much for gas. The Corporation therefore apparently took every opportunity of trying to prevent them doing anything. He was unable to see what tangible effect the Bill could have upon Dublin. The issued capital of the Company was £2,250,000, and the proposed capital for electricity purposes was £50,000. Even assuming no revenue was received at all from the electricity undertaking, the effect on Dublin must be absolutely infinitesimal. He contended that the case was one for the discretion of the Court, seeing that the proposal of the Bill did not concern Dublin.

The CHAIRMAN: We should not take such a narrow view of the Standing Order as that.

Mr. TALBOT pointed out that the Standing Order contained the words "relating to the lighting of" any town. He contended that the Bill did not relate to the lighting of the City of Dublin. If, however, the Court construed these words as including any local authority within the area of supply, whether the Bill related to that particular area or not, then he could not resist *locus* being granted.

The Court accordingly granted it.

BATLEY CORPORATION BILL.

In this case, the Ossett Corporation applied for *locus* against the Bill promoted by the Batley Corporation.

Mr. JEEVES appeared for the promoters; Mr. G. J. TALBOT, K.C., represented the Ossett Corporation.

Mr. TALBOT pointed out that, under clause 39 of the Bill, it was possible that the Batley Corporation might be able to compete for the supply of water in the Ossett Corporation's statutory area. The promoters had really admitted *locus*, in that they had offered a clause which had not been regarded as satisfactory. He was offered protection against competition in districts where he was already supplying, but not in districts where he was authorized to supply but was not, in fact, supplying.

Mr. JEEVES said he was instructed that the Ossett Corporation were supplying throughout their statutory area, and that the districts for which protection was now asked were those contiguous areas where the Corporation could supply "by agreement." The Batley Corporation took similar powers in these same districts under the Bill.

As the parties seemed very near an agreement,

The CHAIRMAN said the Court was not prepared to decide the point at that sitting. If no agreement could be come to, the case would be taken again at the next sitting.

Kingstown Lighting Scheme.—Next Tuesday has been fixed for the further consideration in the House of Commons of the Kingstown Electric Lighting Provisional Order Bill. The Speaker ruled last week that an instruction proposed by Mr. Muldoon, to provide for the transfer of the undertaking to the Urban Council on terms and conditions to be approved by the Board of Trade, should not have appeared on the order paper with the words "by order" in parentheses following the words "Board of Trade." Mr. T. M. Healy drew attention to the matter; remarking that the instruction was not the same as that originally notified. It has been noted that the original instruction provided for the insertion of a clause to facilitate transfer, whereas the instruction as it now stands discloses words asking the Committee "to consider the advisability of inserting a clause."

BRENTFORD GAS BILL.

HOUSE OF LORDS COMMITTEE—Monday, March 9.

The Select Committee to-day continued consideration of this Bill, the previous proceedings in which were reported in the "JOURNAL" last week, pp. 665-8.

The promoters were represented by Mr. HONORATUS LLOYD, K.C., Mr. G. J. TALBOT, K.C., Mr. MOON, and Mr. F. S. BAKER. The opposition to the Bill was as follows: Hammersmith Borough Council, represented by Mr. PAGE, K.C., and Mr. R. BROWN; Metropolitan Electric Supply Company, represented by Mr. BALFOUR BROWNE, K.C., and Mr. TYLDESLEY JONES; the Barnes Urban District Council, represented by Mr. BALFOUR BROWNE, K.C., and Mr. SZLUMPER; the Chiswick Urban District Council, represented by Mr. COWARD, K.C., and Mr. TYLDESLEY JONES; the Twickenham and Heston and Isleworth Urban District Councils, represented by Mr. W. J. JEEVES; the Richmond Corporation, represented by Mr. SZLUMPER; and the Staines and Feltham Urban District Councils, represented by Mr. C. L. ATTENBOROUGH. Counsel were reserved by the following parties: Wandsworth Borough Council, Great Western Railway Company, Sunbury-on-Thames Urban District Council, Port of London Authority, and Metropolitan Water Board. There were one or two other petitioners who might, it was intimated, appear in person.

FURTHER EVIDENCE ON BEHALF OF THE PROMOTERS.

Mr. William Cash (Messrs. Cash, Stone, and Co., Chartered Accountants) gave evidence particularly with regard to the proposed consolidation of the existing capital of the Company. The Brentford Company at present had capital as follows, all of which was issued: £380,000 of 10 per cent. stock, £330,000 of 7 per cent., and £50,000 of 5 per cent. preference stock. The issued loan capital consisted of £206,250 of 4 per cent. debentures, in respect of which a certain sum as premiums had been received; making a total issued capital of £1,171,290. Of the 7 per cent. stock there still remained unissued £220,940, in addition to unexercised borrowing powers of £93,750. The issued capital of the Staines and Egham Company was £16,000 of 10 per cent. stock, £18,000 of 7 per cent. stock, and £5000 of preference stock. The unissued 7 per cent. stock was £25,974, while the unexercised borrowing powers amounted to £7500. The Sunbury Gas Consumers' Company had issued £20,000 of 7 per cent. stock, and had borrowed £3200. No further share capital powers were available; but there were unexercised borrowing powers amounting to £1800. The standard prices under the various Acts were as follows: Brentford, 3s. 9d. per 1000 cubic feet; Staines, 4s. 3d.; Sunbury, 5s. As already explained, the present price in Brentford is 2s. 4d.; and if the Bill passed, the price in Staines would be reduced to 2s. 7d. from Oct. 1 next, and in Sunbury to 3s. 6d. In regard to the two proposed areas to be added, he pointed out that 1d. per 1000 cubic feet reduction represented £14,200 to the consumers in Brentford, and £1775 to the shareholders by way of increased dividends—roughly, a proportion of 8 to 1 in favour of the consumer. A similar reduction in Staines and Sunbury represented a proportion of 7 to 1 and 2½ to 1 in favour of the consumer respectively. The enormous advantage to the consumers of the two added areas by the proposed reduced prices under the Bill could thus be seen. In addition to this, should there be any further reduction in the price of gas in Brentford, the two added areas would benefit in the same way, in addition. At present, the 10 per cent. Brentford stock paid 14 per cent. dividend, and the 7 per cent. stock, 11¼ per cent. The Staines 10 per cent. stock was at present paying 13¾ per cent.; the 7 per cent. stock 10¾ per cent. Under the terms of the Bill, these dividends would be raised as from Oct. 1 next to 14½ per cent. and 11½ per cent. In the case of the Sunbury Company, although they were entitled to pay 10 per cent. on the 7 per cent. stock, as a fact they only paid 9 per cent. free of tax, which was equivalent to £9 12s. 2d., because the full dividend had not been earned. This was the only case in the three Companies in which the full dividend under the sliding-scale had not been paid. Dealing with the conversion of the Company's stock, witness pointed out that this has been done on many occasions. It made no difference to the consumer as to the operation of the sliding-scale. In regard to the issue of future stock, however, there would be a manifest advantage in issuing the stock at a lower value, with a comparatively smaller premium, as investors were loath to give a very big premium for stock. At present, £100 of the Company's stock stood at £260 in the market, and thus gave a return of £5 7s. 6d. per cent. The Bill proposed to give £250 of "A" 4 per cent. standard stock, with a slide of 2s., for every £100 of present 10 per cent. stock, and £200 3½ per cent. stock, with a slide of 2s. 6d., for every £100 of 7 per cent. stock. The clauses regarding the consolidation and conversion of capital were as follows:

CONSOLIDATION OF CAPITAL.

5.—(1) As on and from the 1st day of January, 1915, the existing consolidated stock of the Company authorized by the Act of 1858 and the Act of 1868, and issued before the passing of this Act, amounting to £380,000, shall be, by virtue of this Act and without further or other authority, converted into £950,000 stock, to be called "A" consolidated stock, and such "A" consolidated stock shall belong to, and be divided among, the persons who are immediately before the said 1st day of January, 1915, entitled to be the holders of the said consolidated stock in proportion to the amount of such stock held by them respectively.

(2) As on and from the 1st day of January, 1915, the existing new stock 1881 of the Company issued before the passing of this Act, amounting to £330,000 (being part of the £750,000 new stock 1881 authorized by the Order of 1881), shall be, by virtue of this Act and without further or other authority, converted into £660,000 stock, to be called "B" consolidated stock, and such "B" consolidated stock shall belong to, and be divided among, the persons who are immediately before the 1st day of January, 1915, entitled to be the holders of the said new stock 1881 in proportion to the amount of such stock held by them respectively.

(3) The Company's existing power to create and issue new stock 1881 to the amount of £220,940 (being the unissued amount of the £750,000 new stock 1881 authorized by the Order of 1881), shall, as from the passing of this Act, be deemed to be a power to create and issue, and the Company may accordingly create and issue "B" consolidated stock to the amount of £441,880, which, when issued, shall, in all respects and for all purposes whatsoever, form one stock with the "B" consolidated stock, into which the existing new stock 1881 of the Company is by this Act converted as aforesaid, but, subject as aforesaid, the Company shall be and continue entitled and liable to issue the unissued "B" consolidated stock as if the same were unissued new stock 1881. Except to the extent of the increase in this subsection provided for, nothing in this part of this Act shall be construed as authorizing any increase of the nominal share capital of the Company.

6.—The Company may, in lieu of raising the said sum of £441,880, mentioned in the immediately preceding section of this Act by the creation and issue of "B" consolidated stock, raise the whole or any part of that sum by the creation and issue of new preference stock, and the provisions of sections 7 to 11 of the Order of 1881 shall apply to any new preference stock created under the provisions of this section.

The CHAIRMAN at this point called attention to the fact that in the petitions there did not seem to be great opposition to the financial provisions of the Bill.

Mr. HONORATUS LLOYD replied that this was rather a difficult question to deal with. The petitions contained the usual allegations that the capital provisions were objected to; but probably when they were dealt with it would be found that there was nothing much in this opposition. Mr. Jeeves, for one, had, however, stated that the amount of new capital being asked for was excessive.

The CHAIRMAN said he raised the question because, if there was not a great deal of opposition, this part of the Bill might be treated in a little less detail.

Witness then handed in a number of tables, the effect of which went to show that, after the conversion scheme had been carried through, the Company would have, with their new capital powers, an available capital of £796,374. Mr. Johnston's estimates had already shown how this would be required in dealing with the normal expansion of the Company's business, and the building of the new Chiswick works. It was true that under the conversion scheme the nominal capital would be increased, and to this extent, as pointed out by Mr. Jeeves on behalf of the Twickenham Council, the special purposes fund would be increased. But it was not unusual for the special purposes fund to be calculated in respect of premiums; whereas in this case the premiums would practically go, under the consolidation scheme. With regard to the suggestion that there should be a separate stock with a different sliding-scale for the new capital, there were two good reasons against it. One was that the Company did not wish to have a number of stocks. They already had three. It was an advantage to be able to say, when issuing new capital, that it ranked with a large amount of other stock, because then the new capital was more easily marketable. If a 1s. 9d slide was applied to the new capital, as suggested, the stock would only pay about £4 19s. 9d., which would make it difficult to sell at par. With regard to the proportion of loan capital, which it was suggested should be a third instead of a quarter, it was not desirable to have too large a proportion of stock of this character. At present, a 4 per cent. gas debenture stock was very difficult to sell at par—in fact, three or four months ago such a stock was sold at £92.

There was practically no cross-examination of Mr. Cash. As already mentioned, Mr. Honoratus Lloyd, in his opening speech, said that the Company did not mind much whether the percentage was a quarter or a third, although in the latter case the larger proportion of loan capital would result in the share capital being reduced by a corresponding amount. The question would no doubt be agreed on clauses.

Mr. *Harry E. Jones*, on the question of site, said it was marvellous how Mr. Johnston managed to preserve the continuity of supply under the conditions existing at Brentford. It would be the greatest blunder if the Company were forced to continue upon the Southall site, when the technical advisers knew that it would be much more economical to go to Chiswick. In regard to this site, he supported all the evidence given in favour of it. As to the possibility of nuisance, he pointed out that in a modern gas-works it was now the practice to preserve even the so-called impurities resulting from gas manufacture and treat them, on account of their commercial value. Thus there was not the slightest possibility of nuisance from smell, smoke, or steam.

Mr. BALFOUR BROWNE, who led off the cross-examination, first touched upon the point that the Commercial Gas Company charge 2s. 4d. per 1000 cubic feet, the same as the Brentford Company, in spite of the fact that the works were on the river. From this he argued that a site on the river apparently did not tend to economies such as had been suggested in this case.

Witness pointed out that only the smallest of the Commercial Company's three works were on the Thames, and that the coal was taken up the River Lea to the other works by special steamers from Newcastle. The latter were of comparatively small carrying capacity. He put the extra cost of coal delivered upon canals at 1s. to 1s. 6d. per ton more than the same coal delivered upon a site on the Thames. In regard to the Gas Light and Coke Company, who charged even more than the Brentford Gas Company—2s. 6d.—witness mentioned that this Company's capital included a great deal of obsolete capital.

Mr. BALFOUR BROWNE: The Tottenham Company are selling at 2s. per 1000 cubic feet. Does not that make you blush for the Commercial Company?

Witness: No, because I am Chairman of the Wandsworth Company, and we sell at 1s. 9d. As regards Tottenham, there are in that area a large number of glass houses burning coke, which are good customers to the Gas Company.

Dealing with the alleged unsuitability of the Chiswick site for building purposes, it was pointed out to witness that, whereas the land scheduled was 18 feet above ordnance datum, land close by, at 16 feet above ordnance datum, had houses built upon it; while a school was built upon land 15 feet above ordnance datum.

Mr. LEWIS COWARD, for the Chiswick Corporation, Mr. JEEVES, for

the Twickenham and Heston Councils, and Mr. ROBINSON (who had now come into the proceedings on behalf of a number of property owners, for whom previously Mr. Woodward, one of the petitioners, appeared in person) briefly cross-examined witness. The points raised related to congestion of traffic in the streets close to the gas-works by carts fetching coke away, to the provision of testing-places, and to the detrimental effect upon the value of property by reason of the existence of the gas-works. Witness was emphatically against the multiplication of testing-places, and thought that there should be one or two central testing-places, to which all local authorities concerned should have access. His objection to a large number of testing-places was partly on account of the cost, and partly owing to the discrepancies arising from the personal equation and the equation of variation in instruments, because very frequently two persons using similar apparatus did not get the same result, although perhaps the difference could be easily accounted for. The cross-examination as to depreciation of property was directed to the point that, whereas the Duke of Devonshire, in selling adjoining land to other purchasers for building sites, had imposed very severe restrictions upon them as to carrying on any business which would create smoke or dirt, in this case the Gas Company had been offered the land free of all restrictions. The Committee were asked that the Gas Company should be put under similar restrictions in the event of the Bill going forward. The effect upon the rateable value of the district by reason of the property near the gas-works gradually getting into the hands of lower-class tenants was gone into. But witness contended that in his long experience the employees of gas-works, who were very well paid, preferred to live near the works; and, if anything, the rateable value was more likely to go up than down.

In reply to the CHAIRMAN, witness stated that the average cost of a testing-station was £250 to £300 for instruments, or from £600 to £700 including the building.

Mr. JEEVES said that therefore, if he offered to provide the premises, he would be offering to bear a great part of the cost.

Sir *Corbet Woodall*, in giving evidence, expressed the opinion that the Chiswick site was a peculiarly suitable one for a gas-works; whereas the Brentford works were a horrible example of a congested works. He held the opinion that not only did a gas-works not depreciate the value of surrounding property, but actually increased the value of a neighbourhood, by setting up a demand for a larger number of houses. From the æsthetic point of view, gas-works could be made to look not at all objectionable. There were many examples of this which had been brought about by the planting of trees and shrubberies, and also gardens. Speaking on the question of power gas, he anticipated that this would only be required in a restricted area. In the case of the Tottenham Company, they obtained powers to supply this form of gas mainly on the strength of a large number of applications which were made by factories near the gas-works; but up to now not a single customer had been obtained. The reason was that, when the cost of putting in the necessary apparatus for using power gas on gas-engines already in existence in the factories was gone into, it was found that it would not pay. Personally, he thought that if the Company could have the clause by which the price of gas for public lighting should be the lowest price charged for ordinary lighting, there would be no need for the power-gas clause, as the Company would then be able to develop the use of the ordinary coal gas for power purposes unfettered. Electricity powers in the hands of gas companies were a common thing on the Continent; it was universal in America; and there were a large number of cases in this country, as had already been explained. Gas companies nowadays frequently supplied gas-engines on consumers' premises for driving electrical generators; and surely it was more economical to generate electricity in one central power station than to have a number of isolated plants dotted about the supply area. This course had been followed in the case of the Tottenham Company for the supply of Wood Green under these circumstances. There was not the slightest risk that the Gas Company would keep up the price of electricity in order the better to push the sale of gas.

Witness was cross-examined at some considerable length by two or three Counsel. Mr. Balfour Browne made much of the possibility of nuisance from smoke, steam, and smell. But the advantages of using vertical retorts continuously working, and involving no water for quenching the coke, were pointed out as an important advance in gas manufacture during recent years, which obviated any possibility of this sort. Counsel asked why gas companies wanted electricity powers, seeing that they were in the habit of decrying electricity. Witness replied that they did not decry electricity to anything like the extent that electric supply companies decried gas.

Mr. PAGE, for the Hammersmith Borough Council, elicited from witness that he did not think authority for the supply of power gas should be given for a radius of more than half-a-mile from the works. He could not support the proposal to supply power gas throughout the whole area. As to the effect of the clause relating to public lighting, it was not intended that anything in the Bill should increase the present prices.

In answer to Mr. LEWIS COWARD, witness stated that he advised the Brentford Company as to the general position of their undertaking four years ago, and recommended the Chiswick site then.

Mr. JEEVES cross-examined at some length on the point as to what justification there was for charging public lighting authorities a higher rate than the lowest charge for gas supplied for power purposes, in view of the statement made by Sir Corbet Woodall that he would recommend the Company to supply ordinary coal gas for power purposes, even if they got their authority to supply power gas. The reply given was that public lighting was not comparable with large power supplies, and, consequently, should not be allowed the same favourable terms. In the case of public lighting, every lamp had to have its own service; and frequently public lighting was not altogether a profitable customer. On the other hand, for large power purposes the gas was supplied in quantities through one main into the premises; and there the matter ended so far as expense on the installation was concerned. Furthermore, large power users generally took their supplies during the daytime; so that the effective carrying capacity of the mains was thus largely increased. One such consumer was equal to 2000 ordinary consumers.

In re-examination by Mr. TALBOT, emphasis was laid upon the point that Kew Gardens is only 300 yards away from the Brentford Gas-Works, and yet no complaints have ever been made as to nuisance and inconvenience. Witness added that if there was to be a nuisance from the gas-works it would be found at Brentford, having regard to the congested conditions under which the works were carried on. The present position of the Metropolitan Electric Supply Company would not be changed in the slightest degree of arsas competition with existing business was concerned. The only alteration in the present position would be that, whereas now the Metropolitan Electric Supply Company might be the only authority applying for an Electric Lighting Provisional Order for a particular district, if the Bill were passed the Brentford Gas Company might also be an applicant for the same district. This would be the only form of competition set up; but it was doubtful whether the Board of Trade would ever grant competitive powers.

Mr. *D. Watney* (of Messrs. D. Watney and Sons, Surveyors) gave evidence with regard to the nature of the property around the Chiswick site, the general character of which had already been indicated. The point raised was that the whole tendency of development along the banks of the river for a considerable distance near the Chiswick site was towards industrial works, and that the class of property near by could in no way suffer by the proximity of the gas-works.

The cross-examination was on similar lines to that of previous witnesses—namely, that, so far as the local authorities were concerned, the rateable value of the district would suffer by the introduction of a cheaper class of tenant, while the owners of the property itself complained of depreciation of their property from the same cause.

This closed the evidence in favour of the Bill.

OPENING OF THE OPPOSITION.

Mr. ATTENBOROUGH, on behalf of the District Councils of Staines, Sunbury, and Feltham, opened the opposition to the Bill. At the outset he stated that he did not propose to deal with the capital, nor did he attach much importance to three or four other matters, with which other opponents would deal. One of the most important matters from the point of view of his clients was the electric lighting question. What was dreaded more than anything else was that these Councils would be left to the tender mercies of the Brentford Gas Company, who might be in a position to purchase the local electric lighting companies, and so shut out the present competition, which had been good for the consumers of both gas and electricity. He maintained that the quality of the gas supplied in all three districts had improved considerably since the introduction of competition from the electric light; and the Councils were convinced that, if ever the electric supply got into the same hands as the gas supply, the public would suffer. In Sunbury at the present time there was no electric light. But negotiations were going on; and there was every prospect of an arrangement being made with private promoters to introduce a scheme. A similar state of affairs existed in Feltham—indeed, an inquiry was now being held by the Board of Trade as to whether a certain electric lighting scheme should be sanctioned. If it were not, the Feltham Council were anxious themselves to undertake a scheme. The argument on behalf of the promoters was that there must be an inquiry by the Board of Trade before the Brentford Gas Company could secure an Order. This might be so, but the Councils which he represented could not help feeling that the proposal in the Bill was the first step in favour of the Gas Company, because they would be able to say to the Board of Trade that Parliament had already sanctioned their applying for electric lighting powers. It would then be thrust upon the local authorities to fight the matter; but the Brentford Gas Company would be at a distinct advantage. Dealing with the price of gas, he said that no justification had been put forward for charging the Sunbury consumers 14d. more per 1000 cubic feet than would be charged the Brentford consumers for exactly the same gas. He agreed that circumstances perhaps justified Sunbury being charged a slightly higher price than Brentford; but there was no justification for making it so much as 14d. As a matter of fact, the Sunbury consumers would be worse off than they were at present, because, although they would have to pay 14d. per 1000 cubic feet more than the Brentford consumers, they would be receiving only 14-candle power gas; whereas at present they had 15-candle power gas. Similarly he objected to the price in Staines being 3d. more per 1000 cubic feet than in Brentford for gas produced under exactly similar conditions to that supplied in Brentford.

The CHAIRMAN, at the close of the day, mentioned that Lord Elphinstone and himself had visited the Chiswick site the previous Saturday.

Tuesday, March 10.

Mr. ATTENBOROUGH continued his speech this morning, and argued that the proposal to charge three prices in the district of one Company was unprecedented. The only justification on the part of the promoters was that at present the outside districts were paying more than was proposed under the Bill. No basis of calculation had been put forward upon which the charges were made. If gas could be sold at 2s. 4d. at a profit in Brentford, then it could be sold at the same price in the other parts of the area. Again, what was the objection to testing-stations being placed in the various districts? The existence of such a station was the only protection the public had. All he asked was that the present testing-stations in Staines and Sunbury should remain. Mr. Johnston had said that the Sunbury Gas-Works would be abolished—and, of course, also the testing-station. He further understood that the Staines testing-station was to be abolished. He did not wish to better his position in this matter, but merely asked to remain as he was. Under the Bill, 20 acres of land could be taken for storage purposes; and it was possible that all this would be taken in Staines, which would be very objectionable, because the Company could store residual products. This would be very detrimental to residential districts like Staines and Sunbury; and some protection should be given the Councils. The fear was that some part of the river frontage in these districts would be taken for the purpose, in view of

the fact that the existing Staines Gas-Works on the river had been an objectionable feature of the landscape for many years. If the Company would agree not to take any lands without the consent of the Local Authority the objection disappeared, or even the consent of the Board of Trade would satisfy him.

Mr. TALBOT, for the promoters, said that the testing-stations at Staines and Sunbury would be maintained while the gas-works were in existence there.

Mr. ATTENBOROUGH said this met him to some extent; but he asked for a testing-station in both places in any event.

Mr. JEEVES, for the Twickenham and Keston and Isleworth Councils, said that the combined population of these districts was some 74,000, or one-sixth of the Company's area; while the geographical area was over one-third of the Company's total area. Thus his opposition must be considered as a very important one. Dealing first with the conversion of capital, any expense entailed in this should be borne by the shareholders and not the consumers; for it was admitted that the benefit of the conversion would all go to the shareholders. Then as regards the special purposes fund, some provision should be made to keep this within reasonable limits under the conversion scheme. As things stood under the Bill, a very large increase in the special purposes fund could be set aside; and he asked that the ½ per cent. allowed to be set aside under the Bill should be limited to the existing capital arrangements, and not applied to the converted capital. He would not press the point as to the borrowing powers, because the promoters had agreed to increase the borrowing powers to one-third, with a corresponding decrease in the capital powers; but he did ask that the new capital should be raised under the Model Clause. In other words, the slide should be 3s. 6d. for every 1d., and not 5s. In this way the Company should be brought into line with all other companies working under modern legislation. On the question of testing-stations, he repeated the points made in cross-examination. In both areas which he represented he offered to provide the necessary building for the testing apparatus. In Twickenham the Council had appointed a gas inspector, who had regularly tested the gas on the Council's premises in the best way that he could; and similar arrangements were now being made in Heston. A matter which he desired to press most strongly was the question of public lighting. Local authorities, who were very large customers for gas, should be entitled to continue to be supplied with gas at the lowest charge made to any other customer. Twickenham and Heston took about 23,000,000 cubic feet each per annum; and there was no justification for changing the present position. Another advantage of public lighting was that at the outset in a new district the gas company found a customer which enabled the laying of the mains to supply all the other consumers. Any suggestion that the Company would be able to supply a cheaper form of gas for power purposes had now gone, because Sir Corbet Woodall had said that the gas supplied for power purposes would in all probability be the ordinary gas. But whatever the form of gas supplied, he protested most strongly against any alteration of the existing protection which local authorities had in the matter of public lighting. The only time that this clause had been asked for and contested it had been refused—that was in the case of the Gosforth Gas Company in 1908. If the clause passed, it would enable the Company to charge small users for heating and cooking at a lower rate than the municipalities, who were such large customers. As to pipes for power gas and ancillary purposes, in view of the evidence that these would be required only in the neighbourhood of the works, he asked that his districts should be excluded. Finally, he indicated that, should the preamble of the Bill be passed, he would wish to deal with a number of matters on clauses. As to land and electricity, he took the same attitude as Mr. Attenborough, with the addition that, where any local authority had the right to purchase an electric supply undertaking, the Gas Company should only be able to acquire it with the consent of the local authority. The Board of Trade, in their report, had pointed out that, because of the power of purchase of the London County Council in the county of London, it would be undesirable to allow the Company to acquire electrical undertakings in the county. Surely a similar restriction should apply to other authorities outside London having purchase powers over electrical undertakings.

The case for the Hammersmith Borough Council was then gone into.

Alderman *S. D. Leah* gave details of the Council's electricity undertaking. He was satisfied with the offer of the promoters that they would not apply for Electric Lighting Orders for districts where there were at present electrical undertakings. With regard to contiguous areas, there was power under the Electric Lighting Act of 1909 for local authorities to combine for the purpose of giving a supply of electricity over large areas; and this matter was now under consideration by the London Borough Councils. Such a scheme would be in conflict with what was now being proposed under the Bill. Objection was taken to the powers to break up streets for laying pipes for ancillary and power purposes. He also objected to the possibility of the public lighting charge being increased, as might happen under clause 66.

Mr. TALBOT said there was no intention of doing this, unless, for such cause as a very large increase in the price of coal, the price to the ordinary consumer had to be increased. The sole point was to be able to give very large users for power purposes lower prices, and to generally develop the power business irrespective of the price for public lighting.

Mr. PAGE, for the Hammersmith Council, said he required some words to this effect in the clause.

Mr. TALBOT, in cross-examining witness for the promoters, pointed out that the only effect of the electrical powers upon Hammersmith would be for the Company to seek to acquire the Council's undertaking; and this could only be done by consent of the Council and the Board of Trade.

Mr. PAGE then addressed the Committee. He said that, so far as Hammersmith was concerned, the Bill had been whittled down to a considerable extent; and many of the important matters which he came into the room prepared to fight had gone. For instance, he thought the Company intended to take powers to set up a generating station in Hammersmith in competition with the Council; but this was stated not to be the intention. Again, the position of Hammersmith would not be altered by the clause giving the promoters powers to acquire electrical undertakings. The evidence of Mr. Johnston was also to the effect that the Company would not interfere in any way with existing supply authorities individually or jointly should combinations be made under the Electric Lighting Act of 1909. The Hammersmith Council, however, objected to the Company having authority to make power gas, because it would compete with the Council's electricity undertaking.

Mr. TALBOT said that, as Sir Corbet Woodall had said the power should not be given for more than half-a-mile from the works, the Bill would be amended to this effect.

Mr. PAGE replied that in that event Hammersmith would not be affected, because the works were more than half-a-mile away. As to public lighting, he would be content so long as the present difference between 2s. 4d. and 1s. 10½d. was maintained. He did not ask for a reduction because some power user had his gas at a lower price than the ordinary price charged to the average consumer.

The property owners' case was then taken. A number of individual owners were called; and in the evidence reference was made to the restrictive covenants under which the various plots of land were sold. The impression, it was said, was that the remainder of the land was to be let for the building of houses on similar terms—viz., the prevention of any possible nuisance through manufacturing processes.

The CHAIRMAN ruled that the Committee could not go into any question of the impressions of the petitioners when they purchased their land. It would be impossible to discuss any grievance with the late Duke of Devonshire.

The evidence was therefore directed to the opposition of the property owners to the proposed works; many of the tenants of the houses having already intimated that they would not renew their tenancies if the Bill were passed. A possible depreciation in rental value of one-third was spoken of. The amount of capital invested by the petitioners is £15,000.

Mr. TALBOT, in cross-examination, pointed out that, under the terms of two of the conveyances which he had seen, the Duke of Devonshire expressly reserved the right to deal with the remainder of the land in any manner he pleased. It was elicited from the witnesses that some of the other works in the neighbourhood had depreciated property, and, added Counsel, "You have got to put up with it." It was put to witnesses that other undertakings could come to the land and create nuisances without the necessity of going to Parliament for powers to carry on the business as in the case of gas companies, and in this event the adjacent owners had no remedy whatever beyond that provided by common law.

Mr. ROBINSON then addressed the Committee on behalf of the property owners. He maintained that the general character of the property in the neighbourhood of the Chiswick site would undoubtedly be depreciated if the gas-works came; nevertheless the owners had no right to claim compensation as the law stood. No justification had been given for changing their works to Chiswick. The Company were already supplying as cheaply as the majority of gas undertakings in the country. What was the necessity for a new site? The Company had ample land at Southall; and any economy likely to accrue from going to Chiswick was the infinitesimal one of 1d. or 2d. per 1000 cubic feet, when viewed in the light of the damage to be done to the property owners. No great public necessity had been shown by the promoters to justify this part of the preamble of the Bill being passed.

Mr. BALFOUR BROWNE here interposed a witness on behalf of the Barnes District Council, although this opposition will be taken in detail later.

Mr. *Sidney Parry* (the Surveyor to the Lowther Estate, Barnes, consisting of 100 acres of undeveloped land) said that no houses of less rental value than £45 were allowed to be built upon the estate, which is opposite the Chiswick site, on the other side of the river. It was his opinion that the value of the estate would be seriously depreciated if a gas-works were built opposite it.

Mr. HONORATUS LLOYD pointed out that the property in question was beyond the 300 yards limit. Therefore Sir Gerard Lowther, the owner, had no *locus*.

Mr. BALFOUR BROWNE said the witness was called on behalf of the Barnes Council.

There was no further cross-examination.

Mr. LEWIS COWARD proceeded with the case for the Chiswick Urban District Council, and addressed the Committee before calling evidence. The preamble of the Bill did not allege that the existing gas lands at Brentford and Southall were inadequate, nor was it stated that further extensions could not be made at Southall. Therefore the promoters must prove that it was beneficial to the public interest that a new works should be erected. It had been shown that the new site would be an advantage to the shareholders, and that there might be a slight benefit to the consumers; but this was not sufficient to override the fears of the inhabitants as to the effect upon the district of the advent of a gas-works. At present there were only five factories in Chiswick. Apart from these, the whole district was a residential one.

Mr. *E. Willis*, the Surveyor to the Chiswick Council, gave evidence in support of the Council's case, which has already been outlined in cross-examination and in Mr. Lewis Coward's speech. As to nuisance, he said he had inspected some of the most important gas-works in the country, and in very few instances was there a complete absence of smell and nuisance. He specially went to Luton, where he was informed the most up-to-date works were to be found. While admitting that modern gas-works created less nuisance than others, nevertheless there was still some nuisance; and the public sentiment in the matter was quite sufficient to create a deleterious effect upon a district. Dealing with the trade effluent from the gas-works, witness said the Council would refuse to have it in the sewers; and if it were dealt with as at Richmond—viz., put into pits—it would very seriously affect the surrounding district.

Wednesday, March 11.

The proceedings to-day were mainly devoted to the hearing of evidence from residents in Chiswick and Barnes, and persons using the

district for pleasure purposes, as to the undesirability of the erection of gas-works on the proposed Chiswick site.

Mr. *Edward Willis*, continuing his evidence-in-chief, and speaking in regard to a remark made by Sir Corbet Woodall for the promoters, that house refuse was deposited quite near the proposed site, contradicted this statement.

In cross-examination by Mr. TALBOT, witness said that it was the policy of the Urban District Council of Chiswick to keep the amenities of the district as at present. They could not, however, prevent workmen living in Chiswick. On the question of nuisance, Counsel remarked that in the modern vertical retorts the coke came out cold; but witness disagreed. He spoke from his experience of the Luton Gas-Works—one of the most up-to-date works in the country.

Mr. *T. E. Forster*, J.P. (President of the Chiswick Ratepayers' Defence Union, and Vice-President of the Chiswick Horticultural Society), Colonel *Gordon*, Mr. *H. N. S. White* (a member of the Chiswick Ratepayers' Defence Union), Mr. *G. T. Devonshire*, and Dr. *T. S. Tuke*, all residents in Chiswick, spoke on the general question of the depreciation of the district through the gas-works being placed at Chiswick, and of the keen feeling of the ratepayers against the proposal.

Mr. *E. W. Maples* (Assistant-Secretary for the Higher Education Department of the Middlesex Education Committee) said that in April last the Middlesex County Council purchased from the Duke of Devonshire some land for the purpose of erecting secondary schools for girls and for boys. All this land had been developed, and a large sewer had been put down in order that it might be of sufficient capacity for the new houses to be built on the site to be developed. The Education Committee would never have purchased the site if they had known that the gas-works were going to be put so near.

The case for the Barnes Urban District Council was next taken.

Mr. *Arthur Valon* said he had inspected the proposed lands, but was of the opinion that the Company could do better by continuing to extend upon the 30 acres available on the existing Southall site. There it would be possible to produce a further 20 million cubic feet per day, in addition to the whole of the present make, both at Brentford and Southall. He then handed in the following tables:—

TABLE A.—*Saving over Existing Consumption of* 3,351,605,000 *Cubic Feet if Whole Manufacture were Concentrated on Chiswick Site.*

—	Amount.	Per 1000 Cub. Ft. on Total Sale of 3,351,605,000 Cub. Ft.
	£	d.
Extra cost of coal (Southall over Brentford) 1s. 3d. per ton on coal carbonized at Southall (126,304 tons)	7,894	0·565
Coke. Less price realized at Southall average 1898 to 1913 inclusive— 1s. 1·78d. on coke sold at Southall, 48,939 tons	2,810	0·201
Saving claimed of Chiswick over Brentford— 4d. per ton of coal carbonized on 189,562 tons	3,159	0·226
	13,863	0·992

TABLE B.—*Saving over Whole Consumption if* 5,000,000 *Cubic Feet per Day were Sent Out from the Chiswick Works, and the Existing Sale from the Existing Stations.*

—	Reduced Cost on Chiswick Site over Existing Stations as per Table A (per 1000 Cubic Feet Sold).	Saving per Annum if 5,000,000 Cubic Feet per Day were Manufactured at Chiswick.	Net Saving per 1000 Cubic Feet over Total Output of 4,351,605,000 Cubic Feet—viz., 3,351,605,000 at Existing Stations, and 1,000,000,000 at Chiswick.
	d.	£	d.
Extra cost of coal— Southall over Brentford . .	0·565	2354	0·130
Coke— Less price realized at Southall	0·201	837	0·046
Saving claimed of Chiswick over Brentford	0·226	942	0·052
	0·992	4133	0·228

TABLE C.—*Saving over Whole Consumption if* 10,000,000 *Cubic Feet per Day were Sent Out from the Chiswick Works, and the Existing Sale from the Existing Stations.*

—	Reduced Cost at Chiswick Site over Existing Stations, per Table A.	Saving per Annum if 10,000,000 Cubic Feet per day were Manutured at Chiswick.	Net Saving per 1000 Cubic Feet over Total Output of 5,351,605,000 Cubic Feet—viz., 3,351,605,000 at Existing Stations and 2,000,000,000 at Chiswick.
	d.	£	d.
Extra cost of coal— Southall over Brentford . .	0·565	4708	0·211
Coke— Less price realized at Southall	0·201	1675	0·075
Saving claimed of Chiswick over Brentford	0·226	1883	0·084
	0·992	8266	0 370

These tables showed that the saving under the various circumstances set out in them was so small as not to justify putting gas-works in such a residential and popular district as Chiswick, in view of the keen local opposition to it. Furthermore, to obtain these very small economies it would be necessary to scrap a large amount of valuable plant at Southall and Brentford—assuming, of course, that all the production was concentrated at Chiswick—to say nothing of the cost of the rearrangement of the mains. As, however, the Company did not contemplate for a very long time concentrating all generation at Chiswick, it was not likely that this cost would be incurred. Therefore there was no justification for injuring the district for such a comparatively small output as 5 or 10 million cubic feet per day.

Mr. HONORATUS LLOYD, in cross-examination, obtained from witness the admission that the Chiswick site, *quâ* site, was a good one for gas-works. Cross-examination on his tables took the form of questions in order to enable Counsel to understand more clearly their purport. It was pointed out to witness that his saving of 0·992d. per 1000 cubic feet was practically half that estimated by Mr. Johnston. Even so, it was a very considerable saving, taken over the whole output, and a proportionate advantage to the consumers to that calculated by Mr. Johnston. Witness agreed that continuous vertical retorts practically abolished nuisance from gas-works; but he said he knew of no means by which the smell from purifiers could be prevented.

Mr. BALFOUR BROWNE, in re-examination, made the point that ¼d. per 1000 cubic feet, as shown in Table B, was not sufficient justification for placing gas-works in such a neighbourhood as Chiswick. Certainly the proportion of one-ninth to the shareholders did not seem to be very attractive from this point of view.

Mr. *A. F. Greenwood* spoke of the possibility of inconvenience and damage to boating generally through the presence of so many barges. The creation of currents due to the wharf was also mentioned.

Sir *Alexander Stenning* (a surveyor) supported previous evidence, and said that only the smaller class of property was usually to be found round gas-works. Without the gas-works, the site at Chiswick would undoubtedly be developed for residential property.

Mr. BALFOUR BROWNE, replying on behalf of the Barnes Urban District Council, remarked that at the present time the most discredited occupation seemed to be that of a landowner; but Parliament was exceedingly jealous of the rights and duties of local authorities. One of the duties of local authorities was to protect the people in their area against depreciation which might take place through the ruthless conduct of a company such as the Brentford Gas Company. It was purely a company's Bill. They saw that, by the expenditure of this large amount of capital, they could make a good thing of it in the future, especially having regard to the great development which might take place in Staines, Egham, and Sunbury. The Bill was really in the interests of the shareholders; nobody believed that it was at all in the interests of the consumers. It was a lucky thing for the opponents that an inquiry had taken place three years ago as to the Southall works. It was proposed then to run a railway through the works; and the protest that the Gas Company made was not to take away an inch of their spare land. Although it was not used at that time, it was there that they were going to manufacture in the future; and they had laid out works on the land to manufacture 20 million cubic feet of gas per day. This was beyond their greatest hopes upon the Chiswick site, as they had only put down in the estimates plant for 5 million cubic feet. It would have been built upon at Chiswick if it was not for the error of the Chiswick Council in adhering to a scheme by the Duke of Devonshire. It would do damage to the only pleasant reach on the river between Putney and Mortlake, and it would be deleterious to rowing men with dust flying about when their lungs were expanded. There was really no public purpose in it. It was not sufficient to say that they would disregard the local authority in Chiswick, the local authority of Barnes, and the landowners on both sides of the river, who would all be injured by the erection of gas-works on the proposed site. It was absolutely unprecedented.

Mr. *Cunliffe Owen* (Secretary of the Metropolitan Electric Supply Company, and also of the Brentford Electric Supply Company) then gave evidence with regard to the petition of the Metropolitan Electric Supply Company. The Brentford Electric Supply Company had been giving a supply of electricity in Brentford for the last two years, and had made very satisfactory progress. The competition between the gas and electricity companies in Brentford was very acute. From this competition the consumers had benefited. The Metropolitan Company had, since 1906, been taking over transfers of Electric Lighting Orders. They had no interest in taking over these Orders except to work them in the interests of the consumers. If the Orders were obtained by the Gas Company, the greater interest which they would have would be not to supply electricity, but to stifle any competition with gas. The powers asked for in the Bill with regard to the supply of electricity were against the public interests.

Mr. HONORATUS LLOYD again said that the Company were willing to modify clause 62 of the Bill [which gives the Company power to apply for Provisional Orders to supply electrical energy] so as to limit their power to apply for Orders for districts in which there was not already any body authorized to supply.

Witness said that only independent electric supply companies should have Orders in the ordinary course, and agreed with Mr. Honoratus Lloyd's suggestion that it would be better for the Metropolitan Electric Supply Company from the point of view that the latter could supply the smaller companies in bulk.

Mr. HONORATUS LLOYD: You think the Gas Company might be able to compete with you, and do it on more economical terms?

Witness said that obviously the gas people would only be taking electric supply Orders so as to use gas for making their electricity. He claimed a monopoly of supply for the Electricity Company in its area, in order to maintain the keen competition which would necessarily prevail, and which was so beneficial to the consumers both of gas and electricity.

Mr. HONORATUS LLOYD said he took it that the Electricity Company objected to anybody else having power to take a transfer of an existing

Order, because, if the Gas Company succeeded with the approval of the Board of Trade, the Electricity Company believed they would have no chance to supply in bulk. The Electricity Company wanted to protect themselves.

Witness said he agreed with this view.

Mr. BALFOUR BROWNE said that, if the Gas Company obtained an Electricity Order, it would not be for the purpose of supplying electricity, but so as to be in a position to compel everybody to take gas. In addressing the Committee, he said that the whole intention was that the Gas Company were going to compete with the Electricity Company. They would give a larger sum than an ordinary electric supply company for an Order, so as to get the monopoly of the supply of both gas and electricity. Up to the present time, the competition with gas and electricity had been most salutary from the public point of view. Referring to the Board of Trade report on this question, he pointed out that the Board doubted the expediency of a gas company being empowered to acquire the undertaking of an electric supply authority. If the Gas Company had electrical powers, why should not the Electricity Company have gas powers? When the question was put to Mr. Johnston as to whether he would oppose the Electricity Company if they proposed to supply gas, the reply was that the Gas Company would certainly do so. He therefore asked the Committee not to grant these powers.

Thursday, March 12.

Mr. TALBOT replied on behalf of the promoters. He said he would like to clear away one thing, and that was the suggestion on the part of Mr. Balfour Browne that the Company, in promoting the Bill, had been hypercritical as to its objects. Mr. Honoratus Lloyd, however, had explained in opening that the object of the Bill was to benefit the Company and the undertaking, and to enable the business to be carried on with more advantage. The Company had no right to spend the shareholders' money in promoting Bills for any other purpose than for the benefit of the undertaking. On the other hand, it was the function of Parliament to see that any proposal engendered in the interests of the shareholders was also in the interests of the public. In the gas industry especially, Parliament had taken pains to ensure that the interests of the public were safeguarded by the imposition of the sliding-scale, under which the interests of the consumer were automatically cared for. Therefore it was useless to suggest that this was a Bill solely in the interests of the Company. As to the proposed site at Chiswick, the opposition had throughout the case argued as if the Company were asking for compulsory powers of purchase from somebody who did not desire to sell. As a fact, the Company were merely asking for sanction to a bargain with a gentleman who had tried for many years to dispose of the land for other purposes, but who was now advised that the arrangement with the Company was a good one. Therefore, *primâ facie*, the bargain ought to stand. The opposition of the property owners was on the basis that they would not get any compensation; but they were in a much better position under a sale of land by agreement, as in this case, than a sale of land by compulsion. In the present instance, whatever liabilities attached to the Duke of Devonshire as to anyone creating a nuisance upon the land would be taken over by the Company; but in the case of a compulsory sale, then a legal nuisance could be created, and the adjoining owners would have no right of action. As things stood, however, the Company could be proceeded against if they created a nuisance. Furthermore, instead of the adjoining owner having to bear the expense of taking such an action, the local authority could put the Attorney-General in motion to restrain the Company from creating the nuisance. In other words, at the present time the owner of the land was free to sell or develop it for any purpose so long as no nuisance was created; and the Gas Company would be in the same position. No existing rights were interfered with in any way whatever. The question for the Committee was whether the erection of gas-works on this site would create such a nuisance as to entitle Parliament to refuse to allow it, and to deprive the shareholders and consumers of the advantage of the cheaper manufacture which could be obtained. Obviously it was the motive of the Company not to do anything which would in any way retard building operations; for the more houses there were built, the better for the gas consumption. It was, however, in a part of the district where all the industrial development in Chiswick was taking place; and there was nothing so singular in the manufacture of gas as would justify the Committee in preventing the Company buying the land for gas-works purposes. The majority of the objections were hardly worth consideration. The danger of smell had been referred to, the carrying of coke along the roads—what were roads for but to carry things?—the barge traffic to the site with coal, and so on. He could quite understand that, at the first, people did not very much care about gas-holders being built near them; and this was really the only practical point advanced against the proposal. But to deal with a matter of this description, the character of the district must be taken into account. One could not expect an uninterrupted view of the river landscape in a place so near London as Chiswick; and the Company intended to do everything possible to prevent interference with the amenities of the river by laying out with trees a belt of land close to the river. In a very short time these would practically block out the gas-works from view so far as the river was concerned. Boating men on the river would most certainly not be able to see anything of the works.

The CHAIRMAN: Have the Company ever contemplated making a dock inside the river wall?

Mr. TALBOT: I do not think it has been contemplated.

The CHAIRMAN: But everything is possible for engineers nowadays.

Mr. TALBOT agreed, but again stated that the building of a dock had not been considered by the Company. Continuing, he said that the whole basis of the case in favour of the site was that the Company were at present tied to Southall for extensions, where manufacture was so much dearer than it would be at Chiswick. In this connection, he remarked that he could not understand why Mr. Valon had been called for the opposition, because his tables really only confirmed what Mr. Johnston had said for the Company. It was not suggested that there would be 2d. per 1000 cubic feet advantage at Chiswick for the present output, but only when the greater proportion of the output was produced there. There would always be an advantage in manufacturing at Chiswick; and this would increase as the proportion of the total output manufactured there increased compared with Brentford and Southall. As to power gas, the Company were prepared to carry out the suggestion of Sir Corbet Woodall—that these powers should only be granted for an area of half-a-mile from any of the gas-works.

Mr. JEEVES, for Twickenham and Heston, asked if this undertaking was to apply also to ancillary pipes.

Mr. TALBOT said he did not consider this a preamble point; it could be dealt with later. The position as to public lighting had been explained to the Committee; and the opponents generally were content if an undertaking were given that the percentage difference between the present ordinary price of gas and the price for public lighting was maintained. Similarly with regard to electric lighting, there was no intention of interfering with any existing authority. No doubt the Board of Trade report must also weigh with the Committee; but no reasons were given why it was thought inexpedient to give electric lighting powers to a gas company. It had been done on many occasions. The opposition of the Metropolitan Electric Supply Company was a curious one; for while on the one hand their witness said he agreed with competition between gas and electricity, on the other hand he disagreed with competition in the matter of obtaining lighting orders. He (Mr. Talbot) thought that there was nothing in this opposition. As to the added areas, the position was before the Committee; and it was the belief of the Company that, in making the proposed changes in the charges, they had held the balance equitably between the parties The question of testing stations was another matter in which the local authorities were unreasonable in asking for further facilities than those which already existed. The only object of having testing-stations in every district was for the purposes of penalty—a state of affairs which was most harassing. Therefore it was offered to keep all the existing testing-stations in use so long as the works were in use; and all the local authorities would have the right to come to these stations and test. To increase the number would be to place an unreasonable burden on the Company.

Mr. JEEVES said he had not called evidence on this point, as he understood that it was standing over pending the decision in the case of the Gaslight and Coke Company's Bill.

Mr. TALBOT said this Bill concerned quite a different point—viz., whether there should be an illuminating power test or a calorific value test—and had nothing at all to do with the number of testing-stations. Finally, reference was made to the powers to take land throughout the area to the extent of 20 acres. The existing powers of this character, which enabled the Company to acquire 12 acres, were exhausted; and the suggestion seemed to be that the Company would make some sinister use of the new powers, and take the 20 acres in one parish, and in the most beautiful spot. Whether the Company would ever require 20 acres he did not know, but certainly regard would in any event be had to the wishes of the local councils. None of the lands so taken could be used for manufacturing gas, and would only be required for such purposes as show-rooms, depôts, &c. He did not propose to deal with the capital proposals in the Bill, as there was practically no opposition to these.

The CHAIRMAN said he understood this to be the case.

The room was then cleared, and the Committee deliberated for some twenty minutes.

The CHAIRMAN subsequently announced that the Committee had decided that the Bill may proceed; but they could not give the promoters the site asked for at Chiswick. There were one or two other alterations which the Committee would require to be made in the Bill. Testing-stations must be continued at the various works so long as gas was sent out from these works. The conversion of capital, and the acquisition of the adjoining Companies, were agreed, and would remain in the Bill. The Committee approved of the electric lighting clauses, subject to the alteration agreed during the proceedings, that no Orders would be applied for in areas where there is an existing electric supply authority. The alteration asked for in regard to the charge for public lighting would be sanctioned, and the limitation of area for the supply of power gas to a radius of half-a-mile from any of the Company's works imposed. The Committee understood that the stand-by clause in the Bill was to be modified.

It was then decided to take clauses yesterday (Monday).

ASHINGTON URBAN DISTRICT COUNCIL BILL.

HOUSE OF COMMONS COMMITTEE.—Wednesday, March 11.

(*Before Mr.* MOUNT (*Chairman*), *Mr.* WATT, *Mr.* DENISON-PENDER, *and Mr.* F. W. S. M'LAREN.)

This Bill is for the purpose of authorizing the Ashington Urban District Council to establish gas-works, and to purchase certain portions of the gas undertaking of the Ashington Colliery Company.

The promoters were represented by Mr. HONORATUS LLOYD, K.C., and Mr. F. N. KEEN. The only opponent was the Ashington Colliery Company, represented by Mr. VESEY KNOX, K.C., and Mr. ST. JOHN RAIKES.

Mr. HONORATUS LLOYD, in opening the Bill, pointed out that the Council were taking advantage of section 161 of the Public Health Act, 1875, in coming to Parliament and asking to be constituted a gas authority. There was at present no statutory company supplying gas in Ashington and Hurst, which constituted the urban district of Ashington, and was a mining district in Northumberland, with a population of nearly 30,000. There were in the area some 5420 buildings of various kinds. The arrangements for private and public lighting were insufficient, inefficient, and unsatisfactory. Such gas supply as was available was given by the Ashington Colliery Company, who worked the collieries in the immediate vicinity. The Company had a small gas-works on their own premises, which were primarily erected for the purposes of the collieries. They also supplied their own employees, and others in the immediate neighbourhood of the collieries. That

they were small works could be judged by the rateable value, which was only £51. His information was that the Company had 167 consumers, whom they charged 4s. 9d. per 1000 cubic feet. For many years this supply of gas was the only illumination available; but in 1902 the Council gave their consent to the Northern Counties Electricity Supply Company applying for an Electric Lighting Provisional Order. There then seemed some likelihood of an improvement in the general conditions. But, much to the surprise of the Council, the Electricity Company, instead of erecting their own generating station, made arrangements with the Colliery Company by which the latter supplied the Electricity Company in bulk, who then distributed the current. Furthermore, the curious arrangement existed that before the colliery workmen could obtain a supply of electricity they had to sign an agreement whereby the Colliery Company could deduct the charges for electricity from the men's wages. The Council had been anxious to have further electric mains laid for public lighting, but had not been able to induce the supply company to do so. It was in these circumstances that, after very careful consideration, it was decided to ask Parliament to grant the Urban District Council gas powers. Much correspondence had passed between the Council and the Electricity Company, whose affairs in 1912 passed into the hands of the Newcastle Electric Supply Company; but the best offer for the complete public lighting of the district was £1700 per annum, which it was felt should not be accepted. A canvass of the district had been carried out, with the following result. There were 2992 houses (mostly colliery employees) lighted by electricity, 133 by gas, 2261 by oil, and 34 by both gas and electricity. In the case of the electrically lighted houses, the inhabitants of 2173 now said that they wanted gas; of the 133 gas-lighted houses, 82 now said they would prefer the Council's gas; 2086 of the oil lighted houses wanted gas; and of the 34 houses lighted by gas and electricity 25 wanted the Council's gas. The Bill asked for compulsory powers to purchase a site from the Duke of Portland for a gas-works; and the Duke was willing to sell. The Bill also contained the ordinary statutory powers, with authority to borrow £41,000 for the purposes of the undertaking. In addition to the Council's own district, it was proposed to supply in a number of adjoining areas. The standard price for gas of 4s. 6d. was suggested for Ashington and 5s. for the outside districts. But the estimates were that the Council would be able to supply at 3s. 6d.; whereas the price was 4s. 9d. to-day. The only petition against the Bill was by the Colliery Company, who alleged that the proposed gas undertaking would involve the district in a heavy loss. The Council's engineers, however, were satisfied that the scheme would be a remunerative one. Objection was also taken in the petition to the proposal to buy the Colliery Company's gas-pipes and distributing works only, and not the whole undertaking; but as the Company at present had no statutory powers, there were no rights to be taken away, though this also was alleged. In any case, it would be for the Committee to say to what extent anything more than the pipes should be purchased. Another point raised was that the clause relating to the supply of fittings was not the Model Clause. This matter could, however, be dealt with at a later stage.

Mr. *C. Alderson*, the Clerk to the Council, gave evidence in support of the Bill. The Council's gas account for street lighting was a very small matter; there being only one such lamp. The annual bill for electricity for public lighting was £750, the number of lamps being 282; whereas the Council regarded 800 as being the requisite number. An endeavour was made to induce the Electricity Company to extend the street electric lighting; but the terms were regarded as too onerous. For the conversion of the 84 street petrol lamps the Electricity Company required a capital payment of £500, *plus* the price of the current. Later on, for installing 717 street lamps, an agreement for ten years was asked, with an annual payment of £2200, which was subsequently reduced to £1700. The offer, however, was not accepted.

Mr. VESEY KNOX, in cross-examination, pointed out that the Colliery Company had practically made the district [which was assented to], and that they owned 2468 houses out of the 5420 premises in the district. The allegation was also made that the Colliery Company supplied 240 houses with gas [not the smaller number mentioned by Mr. Honoratus Lloyd], and that most of the roads in the larger part of the district were the private property of the Company. It was on this account that they claimed the right to supply gas—a right which was being interfered with. Counsel also put it to witness that the Local Government Board had never allowed a local authority to set up a gas undertaking without purchasing the non-statutory undertaking.

Mr. VESEY KNOX: Do you wish to buy the business as a business or not?

Witness: We want to buy everything off your premises.

You only want to buy the pipes and the goodwill?—The Company are doing what they have no statutory powers to do.

You want to confiscate the business?—That is a question for the Committee. It was on the advice of Mr. Valon that we proposed in the Bill to purchase only the pipes and distributing apparatus.

Counsel added that it was unprecedented in similar circumstances that the non-statutory company should not be purchased.

A discussion took place as to the position of the Northern Counties Electricity Supply Company and competition with that Company.

Mr. KEEN, for the promoters, objected to evidence on this point, as the Electric Supply Company had not petitioned against the Bill.

Mr. VESEY KNOX said he proposed to call the Manager of the Electricity Company, and claimed the right to go into the question.

The CHAIRMAN ruled that this was admissible.

Mr. VESEY KNOX, in his questions on the point, said that £40,000 had been spent on the electrical undertaking in the district; the number of houses wired or in process of wiring being 3655, at an average cost of £6 for service and fittings, apart from cable.

The CHAIRMAN expressed the opinion that these questions were beyond the Company's petition, and that they must be confined to the effect of the gas undertaking upon the electricity undertaking with which the Colliery Company were so intimately connected.

Witness said that, in spite of the building of a new sub-station in Ashington by the Newcastle Electric Supply Company, who were now managing the Northern Counties Company, there had been no improvement in the supply; and the Council had got tired of complaining. They had been advised that they would be able to do the public lighting at a cheaper rate than the £1700 per annum offered by the Electric Supply Company. This advice was given before the Company's offer was made. There would, of course, be competition with the Electricity Company for house lighting; but the Council had not much to fear, unless there was a very great improvement in the electricity supply. The Electricity Company could not be purchased by the Council, under the terms of the Provisional Order, until 1949; and the Company had refused to sell earlier than this.

In answer to the Committee, witness said it was not proposed to purchase the Colliery Company's gasholders, or anything on the colliery premises.

Mr. *John Craigs*, the Chairman of the Urban District Council, said it was not to the interest of the district to be in the hands of the Colliery Company and the Northern Counties Electricity Company. There had been little development of the gas supply other than on the Colliery Company's own property, and no real attempt had been made to supply the district with gas. It was also a matter of great surprise to the Council when the Electricity Company arranged with the Colliery Company for the supply of electricity, as it practically did away with competition. Dealing with the purchase of the Company's property, witness said that any part of the gas-works which might be put out of use as a consequence of the purchase of the pipes and distributing apparatus should be purchased from the Company on fair terms. This, however, did not mean that the remainder of the plant, which must in any case be used for the purposes of the colliery, would be taken.

Mr. VESEY KNOX: You are taking the goodwill for nothing.

Witness said he had been told that the gas undertaking was a losing concern. But he believed no distinction was made in the Company's accounts between the gas supplied to the colliery and that to the other users.

Mr. VESEY KNOX said that, taking the number of houses wired for electricity or supplied with gas, there were 70 per cent. of the houses in the district dealt with for lighting. The only chance for the new gas undertaking would be in the small remainder, unless the existing gas or electricity were displaced.

Witness did not agree that this was so. Even if it were, he would go on with the scheme. However, a large number of the houses wired for electricity did not use it, and generally the district was crying out for a gas supply. He agreed that perhaps it would be fairer for the value of the Colliery Company's gas business to be settled by arbitration. Counsel's point was that the Company would then have the right to prove a goodwill value. Witness would not, however, agree that there was a goodwill value, because the Assessment Committee had been told that it was a losing business. It was for this reason that it was only proposed in the Bill to buy the pipes. He anticipated a large demand for gas for cooking, although at present there were no cookers in the district. This was due to the Colliery Company supplying the miners with coal free of charge; but many of them would rather be without coal-fires in summer. Counsel pointed to the fact that in Northumberland there were no municipalities supplying gas, and suggested that this was owing to the free supply of coal in the mining districts—it being felt that gas supply was not so profitable in these districts as elsewhere.

Counsel then dealt with the price of the site to be taken for the new gas-works, which, in the parliamentary estimates, was £333 for 3 acres. Witness thought this was a fair price. But it was pointed out to him that there were 25 feet of coal beneath the land, which would have to be bought also. Surely this was an absurd price, said Counsel. Witness said he was now buying land at 4s. per yard, although the price in the Bill worked out at 4½d. per yard. There was, however, a vast difference between the sites.

In re-examination, it was pointed out that by agreement the surface of the land only need be purchased, and not the minerals; and it was upon this basis that the estimates had been prepared. The offer of £1700 per annum for the street lighting by the Electricity Company was a death-bed repentance on the part of the Company, after the Bill was deposited. On the question of purchasing the Colliery Company's gas undertaking, witness rather withdrew from the position he took up during cross-examination, and thought it would lead to too much complication to dissect the undertaking and purchase a part of the gas manufacturing plant.

Questioned by the CHAIRMAN, witness said that, in spite of the lower price offered for public lighting by the Electricity Company, the Council was determined to go on with the Bill. The Company had never met the requests of the Council, and, furthermore, the Electricity Company were in the hands of the Colliery Company.

Mr. WATT pointed out that there were some 3000 persons in the district using electricity. Were they dissatisfied with electricity?

Witness said they were, as they could use gas for many other purposes. Furthermore, the electricity supply was not too reliable.

Other questions by the COMMITTEE elicited the fact that no price for the land had yet been settled; also that a definite offer to negotiate for the purchase of the Electricity Company's undertaking had been made, but nothing further came of the suggestion.

Mr. G. H. Warne, a resident in the district, spoke as to the inadequacy of the lighting facilities, particularly in the Hurst area, where petrol lamps were used. At present the charges for electric lighting of the miners' cottages were collected at the Colliery Company's office; and this was causing much dissatisfaction. There was a large majority in the district in favour of abolishing free coals and free houses on the part of the miners. When this was done, there would be a large demand for gas-cookers.

In cross-examination, witness agreed that the masters were willing to abolish the free coal and house system.

In answer to the CHAIRMAN, it was stated that the charges for electric light were deducted from the men's wages by the Colliery Company. Complaint was also made as to the cheap quality of the electric wiring put into the houses. Where there was the opportunity of taking either electricity or gas, the miners preferred gas.

Two local witnesses from the outside areas proposed to be be supplied were also called, and spoke as to the absence of lighting facilities at the present time.

Thursday, March 12.

At the commencement of proceedings this morning,

Mr. *William Readley*, a miner, and a member of the North Seaton Parish Council, gave evidence in support of the Bill.

Mr. *Arthur Valon* (Messrs. W. A. Valon and Son) said he was consulted by the Ashington Urban District Council in 1910 on the advisability of establishing gas-works for a public supply of lighting. There were small works at the Ashington Colliery; and he estimated that only about 60,000 or 70,000 cubic feet of gas could be generated there per day. There were two purifiers, which were not capable of dealing with more than half this quantity.

Mr. HONORATUS LLOYD, for the promoters, said the Company were not pledged to purify the gas at all.

Witness said there was a supply of electricity given in the district by the Northern Counties Electricity Supply Company, who took their current from the Colliery Company. The public lighting in Ashington, which was by electricity, was very poor. He thought the Council could supply half the population with gas, in spite of the fact that electricity was already supplied. After a canvass of the houses in Ashington, witness came to the conclusion that gas-works should be provided to make 50 million cubic feet per annum. It was only necessary to at once put up plant capable of generating 30,000,000 cubic feet per annum. Provision would be made for the other 20,000,000 cubic feet later on—say, five or six years hence. The estimated cost of the works would be £46,000; but only £40,000 would be required at once to supply 30,000,000 cubic feet per annum, and to supply mains and services, slot installations, lamps, stoves, and so on. As the consumption increased, the other £6000 would be required in order to provide stoves, &c. He thought the price charged should be 3s. 6d. per 1000 cubic feet, in order to make the undertaking remunerative. This would provide interest and sinking fund charges upon the amount required. The site proposed was a triangular piece of land, and quite convenient for laying out gas-works, having access to the railway and the road. This was the only case he knew of where, with a population of 30,000, there was no gas supply to be obtained. It was his view that, if there were any parts of the works in the Ashington Colliery thrown out of use by the Council supplying gas, they should be paid for. In the Colliery Company's works there were 24 retorts, each 8 feet long, one small exhauster, two small 6-feet purifiers, which were sufficient to deal with about 30,000 cubic feet per day. There was no station meter, so that it was impossible to ascertain how much gas was made. There was also no stand-by plant.

Mr. VESEY KNOX, in cross-examination, asked why the Model Clause as to the supply of gas-fittings was not in the Bill.

Mr. HONORATUS LLOYD interposed that the Council was quite prepared to insert this.

Mr. VESEY KNOX asked whether the whole of the conditions appertaining to the Colliery Company were such as appertained to all non-statutory companies.

Witness agreed that practically they were. He maintained, however, that this was not a non-statutory gas company, but simply a small "side-show." The Council wanted to give a proper supply to the district, and as far as the experience of witness went, Parliament would expect that the Council should buy up the Colliery Company's undertaking in order to do so. The price proposed to be paid for coal was 15s. per ton, which would have to come from Durham; this being the best gas coal available. The coal raised at the Ashington Colliery was steam coal, and was no good for producing gas. Counsel then questioned witness at some length upon his estimates, and asked for details, which were given as follows: The revenue account provided for the sale of 30,000,000 cubic feet, at 3s. 6d. per 1000 cubic feet, giving a sum of £5250; slot-meter sales were estimated at an extra £600, and rentals from 200 meters and stoves, £100; making a total revenue of £5950. The expenditure upon coal, at 15s. per ton, after taking credit for the return on residuals, amounted to £1238, and the remaining expenditure to £1688, making a total of £2926. Thus there was a profit of £3024 to meet capital charges. The capital expenditure was made up as follows: Land, £333; works and plant, £17,908; mains, £9422; services, slot installations, stoves, &c., for 30,000,000 cubic feet consumption, £12,337; making a total of £40,000. An additional £6000, however, would require to be spent in order to deal with 50,000,000 cubic feet, which would be the ultimate capacity of the works. In answer to further questions in cross-examination, witness said that he thought the Electric Supply Company had entered into a very rash speculation in attempting to supply electricity in a mining district of this character. He doubted very much whether the public electric lamps would give 50-candle power each on a photometer. He estimated that the Council could supply their own gas for public lighting at about £2 per 60-candle power lamp per annum, including everything, for the same number of hours burning as the electric lamps—namely, for about 1500 hours. On this basis, the Council's Bill for public lighting would be about £1300 or £1400, compared with the Electricity Company's lowest offer of £1700 for the same number of lamps. In his estimates the total expenditure worked out at 1s. 11½d. per 1000 cubic feet, of which 10d. per 1000 cubic feet was the net cost of coal, after allowing for residuals.

In re-examination by Mr. HONORATUS LLOYD, witness agreed that it was the practice of the Local Government Board to insist upon a non-statutory undertaking being purchased by a local authority wishing to set up a gas undertaking; but in this case he did not regard the Colliery Company as a gas undertaking in that sense. The Company had, to all intents and purposes, confined their supply to their own employees, and not given a public supply. On the other hand, there was the precedent of the Frodingham Iron and Steel Company, under very similar circumstances, who wished to become the statutory supply authority. When their Bill came before Parliament, however, the Council asked to be made the statutory authority, and, realizing that there was little chance of the Bill passing, an agreement was come to between the Council and the Company whereby the Council became the gas authority. He would not advise going to arbitration for purchasing any portion of the Colliery Company's gas undertaking, owing to the difficulty in dissecting the undertaking, which would involve an enormous expense. This, surely, would not be desired by the Colliery Company, who, in the position of paying nearly one half the rates of the district, would naturally have to bear a very large proportion of this expense. It was common knowledge that gas was cheaper for public lighting than electricity; and he instanced the case of Westminster. There were also cases in which electricity, after displacing gas for street lighting, had itself been replaced by gas.

Mr. *E. H. Stevenson* supported the views of Mr. Valon. The colliery gas-works, which he had inspected, were very small and antiquated; and there must be very great difficulty in turning out gas at a profit. As an instance of the expense of arbitration proceedings in connection with taking over a portion of an undertaking, he mentioned a case which had occupied no less than thirty days. It had been suggested that small gas undertakings in mining districts did not pay; but a striking case to the contrary was the Annfield Plain Gas Company, which was an amalgamation of three small companies. As a result of amalgamation, and consequent better management, the consumption had gone up from 8,000,000 cubic feet in 1907 to 36,000,000 cubic feet last year, and £7 7s. per cent. dividend was paid. He anticipated that the output in Ashington would be 50,000,000 feet within three years of the starting of the works.

In answer to Mr. VESEY KNOX, in cross-examination, witness said Ashington was the only case he knew where a gas undertaking was neither a statutory one nor a separate undertaking.

Mr. *Frank Jones* gave evidence of a similar character. He was emphatically of the opinion that this was not a case for a goodwill purchase.

In answer to the CHAIRMAN, witness said with 2000 private consumers and the public lighting the undertaking would most certainly pay.

Mr. WATT suggested that electric lighting had a big start in the district; being installed in some 3000 houses out of the total of 5400.

Witness replied that gas, of course, would be used for many other purposes than lighting, which was not the case with electricity.

This closed the case for the Bill.

Mr. VESEY KNOX, addressing the Committee on behalf of the Colliery Company, first recapitulated the conditions under which the gas-works exist, and went on to explain how, ten or twelve years ago, the growing population made it apparent that some better means of lighting was wanted. The Company could then have taken the course of extending their gas undertaking, and laid mains as a non-statutory concern. They went into the matter, however, and came to the conclusion that it would be better to encourage an electric lighting company to come into the district and give a supply. The Council were now arguing as if there was no light being given in the district at all. But the Electricity Company had spent a very large sum of money in the houses and in the streets.

The CHAIRMAN remarked that he did not think the money spent by the Electricity Company outside the colliery works would affect the Committee's decision.

Mr. VESEY KNOX said that the Colliery Company had spent money on their gas-works; and it was quite possible that, with the prejudice which had been engendered, the Council would take a delight in substituting gas for electricity in the sort of wholesale way suggested. The people in the district at present had light at a reasonable price. It had been suggested that the Colliery Company or the Electricity Company, or both combined, had forced the miners to take electricity upon the terms that the payments would be deducted from their wages. This he denied. It was the custom in all these districts to deduct portions of the miners' wages at the request of the miner himself, and no pressure had been brought to bear. Having regard to the cheap price at which a great many of the miners obtained their electricity, Counsel said it could not be suggested that the men were to get gas cheaper than electricity. So far as public lighting was concerned, he would show that the district was in a position to get their public lighting at an exceptionally cheap price by electricity, and perhaps cheaper than with gas. An expenditure of £40,000 by the Council on the security of the rates would hit the district severely; and he ventured to suggest that Parliament ought not to authorize this expenditure, unless on a clear case of public necessity. He regarded the Bill as the refinement of injustice, and asked the Committee not to create such a precedent.

Mr. *E. O. Southern* (Agent for the Ashington Colliery Company) said the rateable valuable of the district was £78,826; the Colliery Company's rateable value being £38,000. The gas-works supplied on the colliery some 623,000 cubic feet during 1912. There were 73 houses occupied by colliery officials supplied free with 1,587,750 cubic feet of gas. The supply to other houses outside the colliery premises was 5,455,000 cubic feet; making a total of about 8,000,000 cubic feet. The works really became useless for colliery purposes when the Company electrically lighted the colliery; and the Company were now prepared to sell as a going concern. In his opinion, a fair price for land in the district was 3s. 6d. per yard. In this case, the Council would have to pay £2480 for the land, or, he estimated, £4543 reckoning the mineral rights.

The CHAIRMAN said he did not wish to prejudice the preamble at all; but in the event of the Bill going through, it would be well if the parties could come to some agreement as to the purchase of the Company's undertaking. The Committe did not think the Bill generous enough as it stood. There would be a difficulty about the goodwill under arbitration; and an attempt might be made to arrange something definite without this expense.

Mr. HONORATUS LLOYD hoped something would be done.

Mr. VESEY KNOX said it would be difficult to arrive at a price, as the other side had no means of knowing the basis to proceed upon.

The CHAIRMAN expressed the hope that some attempt would be made, as the Committee were faced with the fact of the heavy cost of arbitration proceedings to determine the goodwill value.

Friday, March 13.

On the resumption of the proceedings this morning,

The CHAIRMAN asked if any decision had been come to with regard to the point he raised on the previous day.

Mr. HONORATUS LLOYD said the promoters had done their best; but they had not been able to persuade their opponents.

Mr. *Southern*, in cross-examination by Mr. HONORATUS LLOYD, said

the works were erected forty years ago, and since that time two new gasholders had been erected. The works were in charge of a colliery engineer and not a gas engineer.

The CHAIRMAN remarked that Mr. Honoratus Lloyd need not trouble to try and prove that the works had not given an adequate supply. The Committee were quite satisfied that this was the case.

Witness, under further cross-examination, said that the gas-works became useless for colliery purposes 15 or 16 years ago, when electric lighting was taken up before the Northern Counties Company came. Therefore, said Counsel, the Company voluntarily rendered the works useless for colliery purposes, and then took up the supply to other people. Witness could not say whether or not any profit was made on the works. The present rateable value of the works and mains was £51. This was put on the works when the supply outside the colliery was first given. Counsel pressed for figures of profit, but was unable to get them. Witness would not say the cost per 1000 feet to manufacture, although he knew it. In fact, Counsel could get no figures of any sort, either as to the gas-works or the price of electricity sold by the Colliery to the Northern Counties Company. He suggested that the price charged to the Northern Counties Company was the cause of the Company practically failing. Witness admitted that there was a clause in the agreement with the Electricity Company that the Colliery Company would not push the sale of gas. But for the arrangement with the Electricity Company, the Colliery Company would no doubt have agreed to the Council piping all the Colliery Company's houses for gas. In consequence of this agreement, the latter Company could not agree to the Council piping even houses not wired for electricity. It was also admitted that contracts had been let for wiring further houses of the Colliery Company since the introduction of the Bill.

In answer to the CHAIRMAN, witness said that since the assessment of £51 was fixed, the output from the gas-works had quadrupled. Since the Newcastle Company took over the management of the Electricity Company there had been a considerable improvement in the supply. The present owners of the colliery had no interest in the Electricity Company. The late Chairman of the Colliery Company had, however, a large interest in the Northern Counties Company. Under an arrangement with the Electricity Company, made about six months ago, the Colliery Company could supply gas in colliery houses not wired for electric light. There was only a verbal arrangement to this effect.

Mr. *R. P. Sloan*, General Manager of the Newcastle Electric Supply Company, said that a capital expenditure of £40,000 had been involved by the Northern Counties Company and the Newcastle Company in affording a supply of electricity to the district, including £3000 upon the new substation in Hurst. The Council had admitted that the latter had resulted in a very great improvement in the lighting. The bulk of the houses had been "free" wired; there being only 100 or so houses wired by the tenants. At present 2950 houses were "free" wired, and a further 635 were in process of being wired—making a total of 70 per cent. of the houses in the district wired for electricity. In making the offer of £1700 for public lighting, the Company sacrificed any profit in order to prevent the present Bill being promoted. Various other concessions were also offered in connection with the general supply in the district. The tariff was 3¾d. per unit, less 5 per cent. for cash, the same as in Newcastle, which was equivalent to 20 per cent. reduction for houses wired by the tenants. For the "free wired" installations, a certain number of metal filament lamps were offered free of charge, and, in addition, the Company had arranged to wire a further number of houses. Finally, he had offered, late last year, to pay the Council's costs to date in connection with the present Bill if the above offer was accepted. He was still prepared to give a guarantee that the terms would be carried out. No reason had been given why the offer was not accepted. Except as to costs, he was still prepared to carry out the offer if the Bill did not pass. The 3¾d. per unit was the lowest price in the kingdom for such a district. At present the average receipts from the "free" wired houses using slot-meters was less than £1; but when the new houses were wired, he anticipated the figure would be £1 7s. 6d. Under the unlimited supply system, the average receipts were £1 19s. 3d. He, however, preferred the slot-meter consumer, as he regarded the unlimited supply system as a bad one.

In cross-examination, witness said he was supplying electricity in all districts of the Northern Counties Company where it was wanted. But he did not, as the Council here proposed, intend to wire all houses and then ask the people whether they would take the current. He asked the people first, and then wired.

Mr. HONORATUS LLOYD: That is exactly what we have done. We have placed before the Committee a list of six persons who express a wish to take gas; and the majority of them are your customers.

Replying to the CHAIRMAN, witness said the contract for the 635 houses stipulated that forty houses per week were to be wired. The work would be started during next week. He was prepared to allow the offer for public lighting to stand even if the Bill were rejected, including the terms to the private users. The only variation would be in the matter of costs, which the Electricity Company could not, of course, bear now.

Mr. *Henry Woodall* said he had inspected the Colliery Company's gas-works and the district generally. As a result, he had come to the conclusion that the Council could not successfully run a gas undertaking financially. Mr. Valon's figures were hardly borne out by what he saw in the district in the matter of the number of houses not supplied with gas or electricity. A good instance of the difficulty of running gas-works in such towns as Ashington was afforded by Houghton-le-Spring, where the average consumption per consumer was less than estimated here. The prepayment consumer's average was 7000 cubic feet per annum, against 10,000 assumed in the Ashington case. Gas-cookers were not generally used in mining districts. In the whole of Newcastle-on-Tyne, the average consumption per slot consumer was 11,400 cubic feet; while in the mining districts of the Newcastle and Gateshead Gas Company the average was 8000 cubic feet with cookers in use, and 6900 cubic feet where grillers were employed. Other instances in this part of the country bore out this view. In Houghton very few people had a free supply of coal; and as a large part of the gas consumption was for cooking, the prospects in Ashington, where the free coal-supply system had for long been in vogue, were not bright. While accepting Mr. Valon's 10d. per 1000 cubic feet for net coal, he could not agree with the 1s. 1½d. for other expenses. At Houghton, the comparable figure was 2s. 3d., and at Annfield Plain it was 1s. 8d.—the outputs being 20 million cubic feet and 35 millions respectively. He did not believe the figure could be brought down below 1s. 8d. in this case. In a district like this, where there were so many houses wired, it would be very unlikely that a very large percentage would change over to gas If the Bill went through, he believed the Council would have to pay about £8000 for the gas undertaking if it went to arbitration, taking the basis adopted in the Scunthorpe case—viz., £1000 per million cubic feet output. The undertaking should most certainly be purchased on the basis of the Lands Clauses Act. The figure mentioned was slightly more than it would be on a structural value basis, although not so high as on the basis of maintainable value. He had adopted Mr. Valon's figures of capital expenditure, and adding working capital, costs of the Act and of the land, he made a total of £56,000 to be expended by the Council. If the profit of £3024 estimated by Mr. Valon were made, this would not be sufficient to meet capital charges during the first five years, although it would do so in the subsequent years of the loan period. In his opinion, this amount would not be earned, owing to the lower consumption of gas by slot consumers, as he had explained. On this basis, he made the gross profit £1912 only; thus allowing a considerable deficit to fall upon the rates.

Mr. HONORATUS LLOYD, in cross-examination, put it that the sale of the Ashington Coal Company was not 8 million cubic feet, but only 5⅞ millions; the balance being nearly all given free to the colliery officials. Witness admitted that the chief factor in this case was the great number of people buying electricity. Counsel pointed out, however, that a large number of them did not desire to continue electricity. He did not deny that gas was as good as, or better and cheaper than, electricity, especially for public lighting. Witness did not think there should be a monopoly of electricity in the district. There should be a public supply of both gas and electricity. Relation must be had to the necessity for not spending capital when one form of lighting was so much in possession. He did not believe that with an output of 30 million cubic feet of gas in this district the profit could be made which was anticipated. Counsel reminded witness that in the case of Frodingham he himself had said that with an output of 10 million cubic feet a handsome profit would be made with a charge for gas of 2s. 11d. per 1000 cubic feet.

In re-examination, witness said Frodingham was not a mining district. He informed the Chairman that the Houghton undertaking was making a small profit. Miners did not use gas cookers. If the price were raised in Ashington to the maximum under the Bill, the undertaking would be nearer a paying proposition. On the other hand, a high price was not conducive to the undertaking developing rapidly.

This concluded the opposition.

The CHAIRMAN said the Committee did not wish to hear Mr. Honoratus Lloyd in reply, as by a majority they had decided to pass the preamble. He asked if the parties had got any nearer to an agreement on the question of the price to be paid for the Colliery Company's gas undertaking.

Mr. HONORATUS LLOYD said he had not received a counter suggestion from the opposition to the one he himself had made.

Mr. VESEY KNOX, for the Colliery Company, said that the main object of the Company was to defeat the preamble of the Bill. Their position was that they did not want to sell the undertaking at any price, as it was felt that it would place a burden upon the rates. He was not therefore in a position to make any offer.

In subsequent discussion, the opposition having refused to discuss clauses,

The CHAIRMAN informed the promoters that the Committee still thought better terms for the Colliery Company should be inserted in the Bill.

Mr. HONORATUS LLOYD said he would make clause 13 read to include the purchase of any of the gas-works thrown out of use by the purchase of the pipes.

The CHAIRMAN said the Committee thought there should be a purchase on "going concern" terms.

Mr. HONORATUS LLOYD replied that in that case the Council would have to pay what the Company asked or go to arbitration, which might cost very much more.

After further discussion, it was decided to modify the clause so as to give the Company compensation in respect of the loss sustained by reason of their ceasing to supply the private houses in the district, in addition to purchasing the pipes, &c., in the streets. Failing agreement, arbitration must be resorted to—this to be on the lines of a clause in the Annfield Plain Gas Act.

The Bill was then ordered to be reported for third reading.

ABERTILLERY AND DISTRICT WATER BOARD BILL.

HOUSE OF LORDS COMMITTEE.—Friday, March 13.

(*Before Lord* BALFOUR OF BURLEIGH, *Viscount* FALMOUTH, *Viscount* RIDLEY, *Marquis of* SLIGO, *and Earl* ROSSE.)

The object of this Bill is to authorize additional water-works and the raising of further capital.

Mr. RAM, K.C., and the Hon. EVAN CHARTERIS appeared for the promoters. The only petitioners were Mr. John Lloyd and Mr. W. R. Herbert, who were represented by Mr. T. R. SYDENHAM JONES.

Mr. RAM said that the object of the Bill was to construct an additional reservoir. In 1910 an Act of Parliament was passed constituting the Abertillery and District Water Board, with the object of supplying water in the districts of Abertillery, Abercarn, Risca, and Mynyddislwyn, in which there was a very large and growing population. The working of the collieries in the area had polluted a very large amount of water which might otherwise have been available for ordinary domestic purposes. In this district it was necessary for the people to live a good distance up the hills; and the water supply to serve this population had to be at a very high level. The estimated population in 1921, at the

present rate of increase, would be over 120,000. The 1910 scheme was for the erection of works which it was thought would be ample for supplying this population. Some considerable difficulties had, however, been encountered in connection with the works authorized in 1910. There had been delay in the execution of the works generally, payments had had to be made which were not anticipated when the Board was before Parliament in 1910, and additional roads had to be made. The principal difficulty, however, was that so great was the pressure of the water that steel pipes had been used; and the price of steel had increased to a very great extent. The result of this was that the Board were obliged to come to Parliament again and ask, in the first place, for more money, and, in the second place, for powers to make another reservoir on the same area to supply compensation water to the River Usk. The only opposition to the Bill was from Mr. John Lloyd and Mr. W. R. Herbert; the point being the effect upon the fisheries of the River Usk. The Conservators of the River Usk, who appeared against the Bill in 1910 on this very point, and were perfectly satisfied with what they got then, did not now oppose. Again, there were no millowners, who depended for their living on the condition of the stream for driving their mills—and there were many of them on the stream—opposing, neither did the County Council oppose. The fisheries referred to in the petition were down the stream 25 miles from where the water was to be taken. Even millers had no *locus standi* to appear against a Bill if they were more than twenty miles below the point from which the water was to be taken. The petitioners, in fact, had no *locus* at all.

Mr. SYDENHAM JONES said that the fishery of Mr. Lloyd was only two miles, and that of Mr. Herbert only three miles, below the point from which the water was to be taken.

Mr. RAM, continuing, said the water was proposed to be taken from the head waters of the stream on a high mountain. This also ensured that there was no risk of plumbo-solvent effect. Furthermore, there was no other water available which the Board could utilize. It was proposed in the Bill to ask for £250,000 of additional capital; and there was no opposition at all on this point.

Mr. *Baldwin Latham* gave evidence in support of the Bill, and spoke of the difficulties of supplying water in the district to keep pace with the rapid increase of population.

Mr. *James Watson* (the Water Engineer to the Bradford Corporation) stated that the reservoir proposed to be made under the Bill was merely for supplying compensation water to the River Usk, and for no other purpose. This would be a great benefit to the stream, as it stored up the flood and surplus water in the winter season; and in the dry summer season the river would have five times the quantity of water which it has at present.

Mr. *George R. Thompson*, who has analyzed the water of the River Usk from time to time, gave evidence as to its purity, and very emphatically stated that the water was in no respect plumbo-solvent.

This closed the case for the Bill.

Mr. SYDENHAM JONES, in addressing the Committee on behalf of the petitioners, laid considerable stress on the point that there were large quantities of pure water being taken from the river; and this would leave a greater percentage of polluted water. He also suggested that a Commission should be appointed to inquire into the condition of the River Usk.

The CHAIRMAN said that was not a question for the Committee.

Mr. *John Lloyd* gave evidence in support of his petition.

Some discussion then ensued as to whether it was worth while asking Mr. Herbert, the remaining petitioner, to come to London so as to give evidence.

The CHAIRMAN intimated that the Committee were prepared to pass the Bill without asking Mr. Ram to reply. But this could not be done without asking Mr. Herbert to give evidence if he thought fit. At the same time, unless there was something more decisive than the evidence already given, he did not think it was worth while to ask Mr. Herbert to come.

Mr. SYDENHAM JONES, in view of this intimation, decided not to call Mr. Herbert.

The CHAIRMAN then decided that the Bill should be allowed to proceed. The clauses were adjusted so that there should be compensation water given to the River Usk to the extent of one-third the amount taken from it.

EDENBRIDGE AND DISTRICT GAS BILL.

HOUSE OF LORDS STANDING ORDERS COMMITTEE.

Tuesday, March 10.

This Bill came before the above Committee on a report by the Examiner of non-compliance with Standing Orders. [See "JOURNAL," Jan. 27, p. 242].

Mr. E. C. COOPER (Messrs. R. W. Cooper and Co., Parliamentary Agents) called attention to the fact that the Examiner had reported non-compliance with the Standing Orders in respect of the definition in the parliamentary notice of the exact limits of supply. The notice set out that the limits of supply were "the parishes of Edenbridge, Chiddingstone, Cowden, Hever, Westerham (part of), Penshurst (part of) and Brasted Detached (part of), all in the county of Kent;" and the grievance of the five ratepayers and landowners who petitioned against the Bill before the Examiner was that, in regard to the three last-mentioned parishes, the exact portions in which supply was to be given were not specifically described. While agreeing that the notice did not describe in actual words the precise geographical area, the Bill did; and there was this anomalous position, that if he had included in his notice the whole of the parishes in question, there could have been no memorial against him for non-compliance with Standing Orders. But because he was frank enough to say that he was only taking part of these parishes, there was a petition against him. As a matter of fact, there was a petition in favour from every member of the Parish Council of Edenbridge except two. One of these, being connected with the Gas Company, refrained from signing the petition; while the other was abroad. The petition had been presented, in his opinion, in an endeavour to get the promoters to agree to something which they did not think was in the interests of the ratepayers or the consumers of gas. There was no petitioner from any of the districts complained of. A full description of the particular parts of the parishes would have involved 120 lines of the "London Gazette," and would then not have been intelligible.

Mr. R. H. FOX (Messrs. Torr, Durnford, and Co., Parliamentary Agents) said there was no difficulty in describing the area of supply of a gas company any more than that of an electricity company. The Standing Orders Committee had only last week refused to allow an Electricity Bill to go forward because the area was not sufficiently described. The promoting Company was a small one; and the memorialists complained that the proper procedure would have been to apply to the Board of Trade for a Provisional Order, under the Gas and Water Works Facilities Act.

The CHAIRMAN (Lord Donoughmore) pointed out that this was not a Standing Order point, but was one the petitioners would be entitled to raise before the Committee upstairs—if the Bill got there.

Mr. FOX said he had been asked to put this point forward at the earliest possible moment, as being one of very great importance, and as bearing on the question of the price of gas to consumers. The promoters had been supplying gas for fifty years without parliamentary powers. If the Standing Orders were not dispensed with, the public would not be put to any inconvenience; and there would be plenty of time for the Company to come again next year.

Lord CAMPERDOWN, in regard to the point raised by Mr. Cooper, asked if the words "part of" had been left out of the description in the notice of these districts everything would have been in order.

Mr. FOX said he did not agree with this, because if the promoters had inserted the whole of the parishes, with an intention to supply only a part, that would have been deceiving the public. Either the promoters had been careless in preparing their notice, or they had not made up their minds which parts they intended to supply. Further, although reference was made to a map in clause 49, the Examiners of Standing Orders had held that where the promoters described their area in reference to a map deposited, that was not sufficient compliance with Standing Orders.

Mr. COOPER, in reply, said that he could not too clearly say that Mr. Fox was entirely wrong on the point with reference to the inclusion in the notice of the whole of the area while the intention was only to supply a part. The promoters would have been entirely within their rights, and within the Standing Orders, if, with the deliberate intention of cutting down the description of the area of supply in the Bill, they had included the whole of the parishes in the notice.

The Committee, after some deliberation, decided to dispense with the Standing Orders.

The Bill will therefore proceed in the ordinary course.

LEGAL INTELLIGENCE.

CONWAY GAS-WORKS NUISANCE APPEAL.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Monday, March 9.

(*Before the* MASTER OF THE ROLLS, *Lord Justice* BUCKLEY, *and Mr. Justice* CHANNELL.)

Wood v. Conway Corporation.

This was an appeal by defendants from the order of Mr. Justice Joyce granting an injunction restraining the defendants from committing a nuisance by emitting smoke and fumes from their gas-works [see "JOURNAL," Vol. CXXIV., pp. 361, 448].

Mr. HUGHES, K.C., and Mr. OWEN THOMPSON (instructed by Messrs. Gibson and Weldon, Agents for J. W. Hughes, of Conway) appeared for the appellants; Mr. CUNLIFFE, K.C., and Mr. TOBIN, K.C. (instructed by Messrs. Sharpe, Pritchard, and Co., Agents for Messrs. Porter, Amphlett, and Co., of Conway), represented the respondent.

Mr. HUGHES, in opening, said this was an appeal against the judgment of Mr. Justice Joyce, whereby he awarded 40s. damages, and granted an injunction in respect of an alleged nuisance caused by the gas-works of the defendant Corporation. The amount of damage was not of much importance; but the injunction was of great importance. He submitted that, under the circumstances of the case, an injunction ought not to have been granted. The action, as originally framed, alleged a very serious nuisance to the comfort of the plaintiff and his family and servants, from smoke and smell and damage to trees and grass. But as the action developed, all the case, except a small matter as regards trees, was either dropped or failed. The whole substance of the action failed; and all that was left was a trivial matter of slight injury to a very few trees. The ultimate result of a long and expensive trial was to prove a trivial damage, represented by 40s., to some few trees.

The MASTER OF THE ROLLS asked whether the learned Judge had found there was an actionable wrong in respect of the works.

Mr. HUGHES said he had not. The injunction for the purpose of protecting a few trees put the Corporation to an expense of some £16,000. The remedy was out of all relation to the wrong. Conway was an ancient walled town running from North-East to South-West, with a gateway on the Bangor Road running from Chester to Holyhead. Attached to the plaintiff's house were some 60 acres of land; and the gas-works were at a distance of 460 yards from the house. The population of the town of Conway was about 15,000. The gas-works were comparatively small; the make of gas being only 31 million cubic feet a year. The works, which were constructed in 1860 by a private Company, had been extended from time to time; in 1880 they were taken over by the Corporation, and had since been carried on by them. The plaintiff, while a member of the Corporation, had nego-

tiated the matter of the purchase. There was no alteration in the site of the works from the time they were constructed up to the present, though the buildings had been altered and enlarged. Plaintiff bought his house in 1875; but no complaint of nuisance of any kind was made till 1908. In 1909, an action was instituted by plaintiff alleging damage to trees in his plantation, which was 75 yards wide by 16 yards long. The trees in the northern part had been planted 38 years ago, and those in the southern part ten years ago. The trees said to have been injured were those in the middle of the plantation. The action commenced in 1909 was compromised; the Corporation agreeing to do certain things to the gas-works, without prejudice, with a view to preventing the alleged nuisance or injury. There was some dispute as to whether everything was done; but this would not be material. There was no complaint from that time on till 1912. In the early part of that year it was thought necessary that some addition should be made to the gas-works by increasing the number of retorts; and application was made to the Local Government Board for sanction to a loan of £3000 for the purpose. Public notice of the inquiry was given; and Mr. Wood attended and raised certain objections, but did not complain of any nuisance to his house or land. The loan was sanctioned, and the extension made in 1912.

Lord Justice BUCKLEY asked whether the additional retorts had come into operation.

Mr. HUGHES said they had not—they were really a provision for the future. In the claim it was alleged that defendants had continually, and were now, discharging from the gas-works over plaintiff's property noxious and offensive fumes, vapours, and smoke, which damaged and destroyed trees, shrubs, and grass, and destroyed the amenity of the property and interfered with the ordinary comfort, and was dangerous to the health, of the occupiers. The fumes were discharged from the retort-house and from coke not properly slaked. The case as set up was a serious one, as it was said that the quantity of gas made would in the future be greatly increased as the area of supply increased. As the case went on, defendants wished to inspect. An application being made, however, plaintiff's advisers declined to allow inspection outside a radius of 200 yards from the gas-works; and application was made to the Court, stating that no cause of nuisance was made outside a radius of 200 yards. The only dwellings within 200 yards of plaintiff's land were two cottages, the occupiers of which were not joined as plaintiffs. In fact, they were called and said they had never felt any inconvenience except when the purifiers were emptied—once in nine or ten months. The gas-works were excellently constructed and carried on. The learned Judge had not found that there was any damage to vegetation or grass—in fact, the evidence was that cows preferred the grass near the gas-works. The evidence as to the cause of the alleged nuisance was long; but it might be summed up very shortly. Then, after describing the method of manufacture carried on at the gas-works, Counsel said another head of complaint was fumes from the chimney shaft.

The MASTER OF THE ROLLS said the chimney seemed to be comparatively low.

Mr. HUGHES said it was 38 feet high; but a higher chimney would be a more serious nuisance, as it could be seen from the plaintiff's house.

Lord Justice BUCKLEY: It is a question whether plaintiff prefers light to smell.

Mr. HUGHES said his contention was that he got neither now. Having read the judgment of Mr. Justice Joyce, Counsel submitted that there was no actionable nuisance of which plaintiff could complain, as no one suffered from it. If at any future time plaintiff built on his land, and nuisance was caused to the occupiers of the houses, then an action could be brought. This had been clearly laid down in the case of *Sturges v. Bridgman*.

Tuesday, March 10.

Mr. HUGHES, continuing his argument, said if what was being done at the present time was a nuisance, the works could not be carried on without being a nuisance; and therefore the injunction meant, in effect, a mandatory injunction to remove the gas-works to another site, which would be a serious burden to the Corporation. Upon the question of whether an injunction ought to be granted, asuming 40 per cent. damage had been done to some of the trees, he quoted the case of *Salvin v. North Brancepeth Coal Company*, where the Court held that the nuisance must be such as to visibly diminish the value of the property, and affect the comfort and enjoyment of the residents; and that persons should not stand on their extreme rights. This view was also taken in the cases of *Aynsley v. Glover* and *Shelfer v. City of London Electric Lighting Company*.

Lord Justice BUCKLEY: Your contention is that the Court will allow to be committed what it holds to be a wrong because the plaintiff can get damages. If it is a wrongful act which is going to be committed from time to time, that is a case for an injunction.

Mr. HUGHES said damages could be given for the injury which had accrued up to the present time, and the order could be so guarded as to show that it did not cover future damage. The Court had a discretion. It could either grant an injunction, or award damages; and his submission was that the injury in this case was capable of being estimated in money. There was no interference with health or comfort, as no one lived near the gas-works. And there was no ground for an injunction as plaintiff had not shown any intention of using the land for building purposes; and plaintiff was not prejudiced in any way, as no prescriptive right was being acquired. Alternatively, he contended that even if there was a *primâ facie* right to an injunction, then it was a case for damages in lieu of an injunction; and the damages could be assessed up to the present time—leaving plaintiff to make a further claim should he suffer damage in the future. He (Counsel) then proceeded to call attention to various passages in the evidence, with a view of showing that the damage to trees was extremely trivial.

Mr. CUNLIFFE argued that there was a considerable body of evidence proving discomfort to health and injury to trees. Dealing with the suggestion that it would cost a great deal of money to move the works, he said there was no evidence as to what the cost would be. The Corporation had a larger area of land where they could put part of the works, so that a nuisance would not be caused. A former engineer had made this suggestion, but the Corporation refused to adopt it. In 1880, there were only five retorts; now there were forty, and the manufacture of gas had increased from 2½ million cubic feet to 31½ millions. From 110 consumers and 30 public lamps, in 1880, the number had increased to 1208 customers, 948 cookers, and 259 public lamps. He submitted that the Corporation had not complied with the undertaking given in 1909 to block-up the louvres, so as to mitigate the nuisance; and consequently the present action was brought. When the Corporation had twenty-four retorts, they were working to the limit of their capacity. They thereupon applied for power to put up more retorts; and the whole burden of their song at the Local Governmnet Board inquiry was that the area of supply, as well as the population, was increasing. It had been said that there were never more than twenty-four retorts in use at once; but it was the intention of the Corporation to put in operation the whole of the forty. The evidence showed that, in charging the retorts, smoke was given off for five minutes; and as each retort was charged four times a day this gave over thirteen hours each day when dense smoke was being given off. Where there was a continuing and increasing nuisance, it was usual for the Court to grant an injunction as well as to give damages. If the learned Judge who tried the present case had thought there was only injury to a few trees, he would not have granted an injunction; but he came to the conclusion on the evidence that the fumes given off were of a noxious description, and caused great discomfort.

Wednesday, March 11.

Mr. CUNLIFFE to-day called attention to the evidence given at the trial in support of his contention that the smoke and fumes emitted from the gas-works caused serious personal discomfort to plaintiff and his family; and this, he submitted, had been clearly found by the learned Judge. Before the action was brought, plaintiff, in September, 1912, wrote warning the defendants that there was an increasing nuisance to his property, and suggesting that they should not spend further money on their works on the existing site. In spite of the advice given to defendants by their engineer, they had since increased the number of retorts, and had removed the retort-house closer to the plaintiff's property.

Lord Justice BUCKLEY said no doubt the damages were merely nominal. But the learned Judge had found there was substantial injury from the fumes; and he accordingly granted an injunction.

Mr. CUNLIFFE said this was so. In support of the proposition of law, that if the plaintiff's rights were infringed he was entitled to relief, Counsel cited the case of *Broadbent v. Imperial Gas Company*.

Mr. THOMPSON having been heard in reply,

The MASTER OF THE ROLLS delivered judgment. He said: This was an appeal from the judgment of Mr. Justice Joyce, granting an injunction restraining the Corporation, who had acquired the gas-works, from so conducting them as to cause a nuisance to the plaintiff, who was the owner and occupier of a house at a distance of some 400 or 500 yards from the works. Originally, the number of retorts from which the most injurious fumes were emitted in the process of making gas was small, and the retort-house was at some distance from plaintiff's house. But afterwards the position was changed; the retort-house was enlarged, and placed at a point immediately adjacent to plaintiff's property. There were disputes some two or three years ago between the parties, when an agreement was come to that the Corporation should do certain things. But it appeared that they had not stopped-up the louvres in the retort-house opposite plaintiff's land or erected ventilating shafts. Before the extension works were commenced, plaintiff made complaint, and suggested that the extensions should be put on some other land. What was the finding of the learned Judge with regard to the facts? It was that the fumes, smell, and smoke came (as they obviously must) in large quantities from the gas-works on to the trees on plaintiff's land, as the prevailing wind was westerly. Some of the trees were actually dead; others were dying; and some were so decayed that, unless something was done to stop it, the plantation put down to screen the works would cease to exist. One of the defendants' witnesses admitted that the trees were in a sickly condition. It could not be doubted that the nuisance was by no means unsubstantial; and unless it was stopped it would become so substantial as to destroy all the trees. It was said that the nuisance did not extend to the house in which plaintiff resided. Plaintiff did not allege that it did; but it was in evidence that the fumes and smell were perceived over a distance of from 100 to 200 yards into the park. The grass in the park was let to a tenant; so that Mr. Wood was not in actual occupation of the field. But he was in occupation of the plantation; and one of the most eloquent pieces of evidence was the exhibit which had been produced, of black deposits taken from the trees. He (the Master of the Rolls) thought that, by reason of the acts of the Corporation, there was a serious, growing, and permanent injury to plaintiff's property. It was said it would be a great hardship on defendants to grant an injunction. At first they said they could not cure the nuisance; though Mr. Justice Joyce did not believe the statement, and he (his Lordship) shared this disbelief. But whether defendants could or could not cure the nuisance was entirely irrelevant. They were now committing that which was a legal wrong, and were threatening to continue the wrong. It was not a question of a temporary nuisance. The case really resolved itself into this: Ought the Court to exercise the discretion given to it by Lord Cairns Act in favour of the defendants and say they ought to be at liberty to continue the nuisance to an indefinite extent, or apply the principle that where a legal wrong was threatened to be continued an injunction should be granted? Mr. Justice Joyce thought it a proper case for an injunction, and that 40s. was a measure of the damage which plaintiff had suffered. From this finding, he saw no reason to dissent. It was not possible to measure damages with any certainty. But fresh actions might be brought; and the question might then arise, Was the damage now occasioned by the increase of works covered by the money which had been paid under the order of the Court in satisfaction of the nuisance to the property? He thought the learned Judge was justified in the view he took of the evidence, and that the appeal must be dismissed with costs.

Lord Justice BUCKLEY, in concurring, said he would in a word or two deal with the question of law which had been argued, and the principle laid down in *Sturgess v. Bridgman*. Setting aside for the moment

the question of injury to the herbage and the two cottages at Twt Hill, Mr. Hughes had argued that assuming noxious fumes were discharged on to plaintiffs' land there was no cause of action, because there was no house within 200 yards of the works, and consequently no occupier who could suffer from the nuisance. This argument was wholly unsound. The true rule of law was this. If any owner of property was by nuisance so substantially injured in the reasonable enjoyment of his property as that he sustained that which was equivalent to a legal nuisance, he was entitled to an injunction to restrain the continuation of the nuisance. It would be obvious, if Mr. Hughes's argument was sound that it would follow that if a man lost all his tenants by reason of the existence of the nuisanee, and could not get other tenants, he was without remedy, as there would be no occupier with a nose capable of smelling or ears to detect the noise. In *Sturgess v. Bridgman*, the Court said the nuisance up to the time when the physician built his consulting room was not actionable ; that so long as the back garden in Wimpole Street was used as a garden, there was no nuisance, as the vibration was immaterial. The point of the case was not that the consulting-room was used as a house, but that until a house existed there was no nuisance. If the fact was that persons who walked in the spinney or plantation at Conway were offended now in their nose by noxious fumes sent over the land, the owner and occupier of the property was injured none the less because there was no house there. It was not necessary to have a house offended by a smell. The right to an injunction existed if the reasonable enjoyment of the property was offended by the nuisance. The owner, as distinguished from the occupier, might sue and obtain an injunction in respect of a nuisance which substantially affected the value of his property ; and it was not necessary to regard the property only in the condition in which it then was. In point of principle, the plaintiff was entitled to say : "My property as it is now, or as I am entitled to use it hereafter, is injuriously affected by the nuisance which defendants are committing." Upon the facts, it was indisputable there were noxious fumes emitted by the gas-works, which affected the trees ; and the fact that the fumes were so discharged over the land as that the land was rendered less capable of beneficial enjoyment entitled the plaintiff to sue. As to reasonable action on the part of plaintiff, it was quite plain that, from 1909 onwards, he had been raising objection to the way the works were conducted ; and notwithstanding the agreement come to in that year the Corporation did not comply with the obligations they undertook to discharge. After his protest, they deliberately made further additions, and built additional retorts, leaving the louvres open so that all the smoke, &c., could escape. Having enlarged the buildings with notice of Mr. Wood's objection, it did not lie in defendants' mouth to say they would be exposed to additional expense. Upon the facts, he (Lord Justice Buckley) thought it was abundantly made out that the plaintiff was entitled to sue, and to the injunction claimed.

Mr. Justice CHANNELL said he entirely agreed with the judgments which had been delivered. The evidence supported the finding of the learned Judge ; and, assuming the facts to be correct, the only question fairly open to doubt was whether it was a case in which the Court, properly exercising its discretion, should give damages in lieu of an injunction. In certain cases, the Court gave compensation in advance for injury complained of—such as in cases of interference with light. But here what was complained of was a nuisance arising in the process of gas making. If the process was altered, the question would arise whether the damage that was then being done was the damage which had been compensated for under the order of the Court. Not only was it impossible to assess damage, but it was impossible to foresee what would be done in future to cause damage. Thus the Court could not reasonably act upon this rule of Court. The damage to the defendants was far in excess of the damage to the plaintiff by the continuance of the nuisance ; but this was not enough for making an exception in the present case.

Mr. THOMPSON asked that the injunction, which had been suspended till June 30, should be further suspended till Dec. 31.

Lord Justice BUCKLEY : What are you going to do ? Are you going to remove the gas-works ?

Mr. THOMPSON said the matter would have to be considered by the Corporation.

Mr. CUNLIFFE said if defendants on June 30 satisfied him that they were doing what they could to comply with the injunction, he would not raise any opposition to a further postponement.

Lord Justice BUCKLEY thought three-and-a-half months sufficient for defendants to make up their mind as to what they were going to do. He was not disposed to suspend the injunction for a longer period ; but there would be liberty to apply on June 30 for an extension of time if it became necessary.

The appeal was therefore dismissed, with costs.

A CARDIFF COAL CONTRACT DISPUTE.

At the recent Glamorgan Assizes, before Mr. Justice Avory and a Special Jury, an action was heard in which Mr. Thomas Taylor, a Pontypridd colliery proprietor, sought to recover £763 19s. 3d. from the Cardiff Gas Company for coal supplied. While admitting the debt, the Company counterclaimed damages for breach of contract, consequent upon the inability of the plaintiff to supply coal, owing to the flooding of the colliery, in spite of every effort to keep the water under. The Company, on the other hand, argued that the plaintiff had not taken due precautions to prevent the flooding. While 5000 tons should have been delivered by Oct. 2, 1912, the amount actually delivered was 2500 tons. An arrangement was then made that the contract should be liquidated at the rate of 130 tons a day.

In summing up, his Lordship said the strike and accident clause in the contract provided that in case of any accident, strike, or lock-out by which the working of the coal might be stopped, the contractor should immediately give notice to the Company ; and during the continuance of such stoppages the contractor should not be deemed to be in default. The Jury would have to decide, first, whether the working of the coal in this case was stopped by any accident. The Jury must apply the meaning of the word "accident" to the facts of the case. It was quite impossible to give a definition which would apply to all contracts. For the purpose of the case, he would define an accident as something unforeseen, and which could not be guarded against by ordinary prudence and foresight, and something which could not be avoided by a reasonable expenditure of money. The general effect of the evidence was that up to September, 1912, the colliery worked satisfactorily. It was sunk in the neighbourhood of old workings ; but a barrier of 66 yards was allowed between this colliery and the adjoining workings, whereas in ordinary mining operations a barrier of 40 yards was considered safe. Unfortunately, in September there was an inrush of water, and afterwards further inrushes, which culminated, in January, in the mine being flooded and closed-down. Mr. Taylor spent £420 in machinery, such as pipes and pumps and hauling apparatus. It would be absurd to lay it down that the plaintiff was bound to spend tens of thousands of pounds in pumping the water out ; for the question of whether it was worth while to go on would arise. The other questions the Jury would have to consider were whether the Company's demand for 130 tons a day was reasonable after Oct. 2 until the end of January, and whether the working of the coal contracted to be supplied was stopped within the meaning of the contract.

The Jury found that the working of the coal was stopped by an accident, that the requirement of 130 tons a day was reasonable for the month of October, and that the working was stopped within the meaning of the contract. In the event of the point of law being upset on appeal, they assessed the damages sustained by the Company at 1s. per ton on the difference between the amount of coal delivered and 60 per cent. of the contract, less the quantity supplied over 60 per cent. during October.

His Lordship gave judgment for the plaintiff for £763 on the claim, and for the plaintiff on the counterclaim. A stay of execution was granted.

EXPLOSION OF COAL GAS IN A TELEPHONE MANHOLE.

Before Sheriff-Substitute M'Diarmid, in the Dumbarton Sheriff Court, last Tuesday, a cable-jointer in the employ of the Post Office Telephone Department sought to recover damages from the Helensburgh Corporation Gas Department, for injuries sustained on Dec. 19 through an explosion of coal gas in a telephone manhole in King Street, Helensburgh.

In the course of the proceedings, it was stated for the pursuer that he lifted the cover of the manhole and struck a match to light a candle before going down, when the explosion occurred. He was severely burned, and was incapacitated from work for three weeks. The Telephone Department had corresponded with the defenders on two occasions in July and September, pointing out that gas was percolating into the manhole ; and it was alleged that defenders had been grossly negligent in allowing escapes of gas to continue. For the defenders, evidence was called to prove that careful search had been made in the vicinity of the manhole for escapes of gas ; and three or four small escapes had been remedied. After the explosion, an escape was found close to a telephone junction-box almost 300 yards away from the manhole ; and it was through a broken cover of this box that gas was getting into the telephone pipes, and travelling along to the manhole. Had this cover not been broken, gas could not have got into the telephone pipes. A witness of the explosion stated that pursuer knelt beside the manhole, struck the match, and held it inside. When the the match was almost burned out, he dropped it ; and the explosion then occurred. The Telephone Department had a rule stating that where there was suspicion of coal gas in a manhole, naked lights were not to be used, and the cover was to remain off for a time before the manhole was entered. The Sheriff-Substitute said he had doubts as to the relevancy of the case. The Telephone Department came and laid their pipes under compulsory powers ; and the Corporation had no jurisdiction over them. He thought, therefore, that the department were bound to take these risks ; but perhaps the point was arguable. However, he did not think the explosion could have occurred had the match been struck above the manhole. It must have been held inside, and probably dropped into it. The rule against the use of naked lights was distinct ; and pursuer was grossly negligent in failing to adopt ordinary precautions. He therefore assoilzied defenders, with expenses, if asked for. The Corporation did not press their claim for expenses.

A SLOT-METER THIEF'S APPEAL.

On Monday of last week, in the Court of Criminal Appeal, before the LORD CHIEF JUSTICE and Justices LAWRENCE and LUSH, Joseph Wellstead, who had been sentenced at the Middlesex Sessions to twelve months' hard labour for stealing from a gas-meter, appealed against his conviction and sentence.

Mr. Justice A. T. LAWRENCE said the appellant and his sister lived in the basement of a house in Hendon, and had left it without giving notice to the gas company that he was leaving ; so that the meter still held the money for the last period. The basement was at the time in the hands of the builders. Prisoner appeared to have visited the house, and was seen to go away. He said he had been to remove certain curtains and poles ; but there were no curtains or poles there. He appeared to have got rid of the money between the time he was seen to leave the house and the time of his arrest ; but the Jury had no doubt of his guilt. He did not go into the witness-box, but called his sister. He had been twice previously convicted, and had been sentenced to four months' hard labour last year for living on the earnings of prostitution. He seemed to have been a thoroughly bad character, and there appeared no reason why the Court should interfere with the sentence.

The appeal was therefore dismissed.

MISCELLANEOUS NEWS.

SHEFFIELD UNITED GASLIGHT COMPANY.

An 8·63 per Cent. Increase Last Year.

The Annual Meeting of the Sheffield Gas Company was held last week—Mr. WILSON MAPPIN in the chair. The report and balance-sheet presented were noticed in the "JOURNAL" for Feb. 17, p. 454.

The CHAIRMAN, in proposing their adoption, said that, although the Company's business last year had been very satisfactory—the sale of gas having increased by no less than 8·63 per cent.—the profit earned had not been sufficient to pay the usual dividend; there being a deficiency on the year's working of £12,367. This was mainly due to the high price paid for coal, which was brought about by the scarcity created by the colliers' strike in the early months of 1912. At that time stocks all over the country and on the Continent were depleted; but he was glad to say that a different state of affairs now prevailed. Most concerns having replaced their stocks, they might confidently look forward to a very considerable reduction in price when they next had to make coal contracts. They would be aware that large quantities of coal were sent abroad from this country; and it was interesting to note that the reverse operation was about to take place—one of the large gas companies in London having contracted on the Continent for a considerable portion of their next year's requirements.

LOW PRICE CONTINUES.

The Company were in the fortunate position of having a considerable balance in hand, which had accumulated over a long series of years. They were consequently able to meet the deficiency, and to hold out to the consumers the prospect, unless something quite unforeseen occurs, of being able to continue the supply of gas at the present low prices, which for ordinary consumers was 1s. 3d. per 1000 cubic feet; the average for the whole year's consumption for all purposes being 1s. 1·48d. What these low prices meant to Sheffield might be gathered from the fact that 1d. per 1000 cubic feet represented the sum of £19,116 per annum; and as the Company had since 1901 made reductions totalling to 10d. per 1000, it would be seen that last year their customers saved £191,160 compared with what they would have paid had the prices been the same as in 1901. The receipts for residuals during the first half of last year were very satisfactory; but since July there had been a considerable falling off, which, he was sorry to say, still continued. This, however, was an experience that they had gone through on previous occasions when coal had been contracted for at high prices, and trade had declined before the expiration of those contracts. In all directions the Company's business was progressing; the additional number of meters fixed during the year being 2354, varying in size from 3 lights to 2000 lights. Then 491 additional cooking stoves had been let on hire; 2053 gas-fires, 2750 boiling, grilling, and other stoves, and 24,948 incandescent burners had been sold; while 71 additional gas-engines, with a total of 3687 H.P., had been fixed. The consumption of gas by engines during last year was nearly 621 million cubic feet—an increase of more than 63 millions over 1912.

HOW TO LESSEN SMOKE.

Business in furnaces had also been satisfactory; the Company having fixed a further 99, the consumption of gas in them varying from 45 to 10,000 cubic feet per hour. They also had an order at the present time from one firm to fix for them four meters of 2000, 1200, 1000, and 400 lights to supply gas for new furnaces now being put in. This was an indication of the manner in which gas for trade purposes had gained ground; experience leading to the extended use of it for furnace work. Every now and again there was considerable talk about smoke abatement; but no real improvement appeared to take place. It was all very well to blame factory chimneys; and there was no doubt that they created a very large proportion of the smoke. But they were not the only sinners in this respect. They had only to stand on the hills overlooking residential districts, where there were large numbers of houses close together, to see the density of the atmosphere overhanging them. This might be remedied by using smokeless fuel in the shape of coke, or greatly lessened by mixing coal and coke together. It was well known that the heating value of coke far exceeded that of coal; it having been ascertained that the radiant heat given off from coke was 44 per cent., against only 19 per cent. from coal. It would, therefore, be beneficial to the user in addition to being a step towards making the town cleaner.

EX-SOLDIER EMPLOYEES.

The Chairman mentioned that out of 1427 men in the Company's service during the week ended Feb. 6, no fewer than 124 were ex-soldiers and 10 ex-sailors, making a total of 134, or 9·4 per cent. of the whole. He thought it would be granted that they were doing their duty in this respect and setting a good example to others.

DAYLIGHT SAVING BILL.

The Daylight Saving Bill was to be brought before Parliament again this year; and in the interests of clerks and others who were employed in offices, &c., he sincerely hoped it might become the law of the land. He could not understand people objecting to it, as he felt sure that the health of those who followed sedentary occupations would be greatly improved by their being able to spend longer periods in the evenings in the open air. After getting up earlier one hour on the first morning, the change in habits would not be noticed. An alteration of this kind was quite impossible without an Act of Parliament, as people would naturally find fault if the gas company were to adopt the plan of closing their offices an hour earlier when other places of business remained open. It might seem strange that, as Chairman of a gas company, he should advocate this. They went into the question some time ago, and estimated that the loss on consumption of gas during the six months would be somewhere about 80 million cubic feet. This would not be a very serious matter when taking into consideration that during the last year their increase was 364 millions; and he did not think they should show selfishness in a matter which would be for the public good. The Chairman, in conclusion, congratulated Mr. Hanbury Thomas on his recovery from his recent serious illness.

Alderman H. K. STEPHENSON seconded the motion, and it was carried without discussion.

The dividends recommended having been declared, Mr. Hanbury Thomas was re-elected Managing-Director, and the retiring ordinary Directors (Mr. Blake and Dr. Sinclair White) were re-elected.

A vote of thanks to the Chairman and Directors and to the staff was passed.

Mr. HANBURY THOMAS thanked the meeting for what had been said in regard to himself, and promised a continuance of his best services to the Company.

The Directors present (besides those already mentioned) were Mr. R. Leader, Mr. R. G. Blake, Mr. M. J. Hunter, Dr. Sinclair White, and Councillor R. Holmshaw, with the Secretary, Mr. W. Hamby, and the Engineer, Mr. J. W. Morrison.

AUSTRALIAN GASLIGHT COMPANY.

The Half-Yearly Meeting of this Company (being an adjournment of the last annual meeting) was held at Sydney, N.S.W., on Monday, Feb. 9—Mr. G. J. COHEN (the Chairman) presiding.

The SECRETARY (Mr. R. J. Lukey) having read the notice convening the meeting, the report of the Directors was taken as read. This stated that the profits for the six months ended Dec. 31 (including the balance brought forward) amounted to £82,086, out of which the Directors recommended the payment of a dividend for the half year at the rate of 10 per cent. per annum on the "A" and "B" shares, and 7 per cent. on the "C" shares—leaving £9558 to be carried forward.

The CHAIRMAN, in moving the adoption of the report, said: I am pleased to meet you under circumstances giving less anxiety than those which have existed for some time past. The Company certainly have had their troubles during the past half year—unfortunately, they often recur; but I trust many of the difficulties touched upon in former years have now been overcome.

THE NEW FORM OF ACCOUNTS.

The accounts to be submitted to-day are in accordance with the "Gas Act, 1912," and more fully explain the affairs of the Company than those previously presented to the shareholders. A comparative statement cannot, of course, be submitted on this occasion, as the accounts are now brought up to the last day of the year; whereas in the past the books have usually been closed at least a week earlier. The result is that the expenditure this half year appears considerably higher, but will correct itself during the ensuing year, after which the accounts will bear true comparison. The amount usually set aside for depreciation has also had to be curtailed through this rearrangement; but matters will ultimately adjust themselves. The provision in the Gas Act for the annual statement of accounts to be made up to Dec. 31 in each year conflicts with the Company's Private Act, which stipulates that the annual meeting shall be held in July. To overcome this anomaly, it may be necessary at no distant date to obtain a short amending Act, when advantage will be taken to include in the measure a clause providing for a reduction in the number of Directors, and other minor matters.

HIGH-PRESSURE LIGHTING.

The Company have on several occasions given displays of the high-pressure system of gas lighting; but the extensive installation at the White City, Rushcutters' Bay, has far surpassed any previous exhibition of this latest form of gas illumination in Australia. The lighting of the extensive area has greatly exceeded the anticipations of the proprietors of this place of amusement—in fact, the results are phenomenal. The lamps employed vary from 150 to 4500 candle power in one unit; and the cost to the White City for the gas is a trifle over ½d. per 1000 candles (actual) per hour. The total illumination exceeds 100,000 candles, with the result that the grounds have the nearest appearance to daylight that has yet been achieved by any artificial light. Is it any wonder, then, that cities in England, and on the Continent, not influenced by personal considerations, have returned to their old love, and reinstated gas in place of electricity? The portion of the allotment of new "C" shares created on June 2 last to those shareholders residing outside the Commonwealth, and held in trust by your Chairman and Secretary, has been duly distributed. The surplus shares, including the fractional parts, were sold at auction on Nov. 11; and the profit on the latter has been paid to your Treasurer (the Bank of New South Wales), for distribution to shareholders entitled to same.

THE PRICE OF GAS.

The Directors applied in October for the standard price of gas to be raised, in consequence of the cost of production having been increased by the Wages Board award made in the May previous. The books have been examined by the Government Auditors; and the Company now await the appointment of a Judge to deal with the matter. Apart from the appointment of Counsel on both sides, nothing further has been done in the arbitration proceedings connected with the resumption of the Company's property in Kent and Jenkins Streets. Your officials have been busy preparing the necessary evidence in support of the Company's claim for presentation to the Court, which I understand will be held in March or April next. Mr. Adrian Knox, our leading Counsel, who has been on a visit to London, availed himself of the opportunity to obtain any information likely to be of assistance to him in the interests of the Company. He is expected back in time to conduct the case.

THE WORKS AT MORTLAKE.

The works at Mortlake are assuming large proportions, as the result of the extensions in course of erection in connection with the transference

of the head station and ordinary additions necessary to meet any increases in the Company's business. Rapid progress is being made with the new gasholder tank; and the first portion of the holder is now on its way from London, together with instalments of the machinery for the completion of No. 3 retort-house and the erection of No. 4 house. The buildings and the tank have been let to local contractors. The delivery of the new 36-inch trunk main commenced some time ago; and it is being laid with all despatch. Owing to the size of the main, it is naturally slow work; but notwithstanding this, there is every probability, should no unforeseen difficulties arise, of the work being completed in the time specified, to enable connection to be made from the Mortlake station to the city.

THE SHEPHERD'S BUSH EXHIBITION.

A National Gas Exhibition, promoted by the leading gas companies and gas committees of Great Britain, was held in London during October, and proved exceedingly interesting and instructive. The opening ceremony, which was performed by the Lord Mayor of London, drew together a large and notable assembly. The advances made by gas during the past few years were most marked, and called for loud expressions of astonishment and praise. It was clearly demonstrated that all the advantages claimed for electricity could not only be equally claimed by gas, but more effectively, and at a cheaper cost. A visitor says the effects were astonishing, no matter what part of the exhibition one attended—whether the shops, drawing or dining rooms, or halls or kitchens of the temporary houses. It was simply a case of "press the button," and gas would do the rest—the lighting, particularly, far surpassing electricity. Sir Corbet Woodall (the Governor of the Gas Light and Coke Company), one of the foremost gas engineers in the world, and this Company's Consulting Engineer in London, was President of the Exhibition, and part of his address will bear repetition. He said:

> The gas industry felt not only that it was able to show in the exhibition what had been done, but also that it would stimulate everybody to what lay before them. He believed the full potentialities of gas were far from realized yet, and that they would see in the near future developments much greater than had attended the efforts in the past. The developments in recent years of the value of gas for lighting purposes had been so great as to equal, if not exceed, the wonderful developments of electricity; but in the region of heating and the use of gas as a fuel, he believed there was pending in the immediate future such a development as would make what had been done so far appear feeble and small.

Coming from such an authority, gas companies evidently have little to fear from their competitors.

GROWTH OF THE BUSINESS.

So far as this Company are concerned, I am pleased to say that the increased consumption of gas during the past few years has been fully maintained, and the large extensions now taking place within the Company's area, to meet the increased demands, indicate much progress in the future. The latest extension decided upon is to those rapidly developing suburbs of Bankstown and Punchbowl, which will be started as soon as practicable. The number of consumers at present is 115,311—an increase of 3660 for the half year. The public lights supplied by the Company are still decreasing, due to the substitution by the municipal councils of electricity for gas for street lighting. The loss occasioned thereby will not be appreciably felt by us. The Company have sold 3043 gas-cookers during the six months, bringing up the total number disposed of to 34,220. This department is a source of much satisfaction. Other manufacturers and agents in the city have also been equally successful in the sale of their particular cookers and other gas appliances, which in a great measure accounts for the day consumption of gas being now so large in comparison with the total output. To meet the Company's increase of business, 80 miles of mains and services have been laid this half year; the total length now being 2919 miles. I will not detain you further, as I think I have said sufficient to indicate to you the progressive nature and stability of the Company.

Mr. A. F. ROBINSON seconded the motion for the adoption of the report and the declaration of the dividend; and it was carried.

On the proposition of Mr. H. de Y. SCROGGIE, seconded by Mr. F. W. WALKER, a vote of thanks was accorded the Directors and officers for their services during the half year.

REPORT OF THE LEEDS SPECIAL COMMITTEE.

It will be remembered that during the strike of municipal employees at Leeds, which lasted from the middle of December until the middle of January, the control of Corporation affairs was placed in the hands of a Special Committee, with Alderman C. H. Wilson, as Chairman. An undertaking was given to the Council by the Special Committee that they would subsequently make a report; and this was issued last Friday—a special meeting of the Council being called for to-morrow to consider it. They have investigated the working of every department, and as a result put forward a number of important suggestions.

It is pointed out by the Special Committee that the strike has shown the necessity for improved methods of dealing with wages, conditions of work, hours of labour, &c., of municipal workmen. They say: To enable such matters to be dealt with properly, the fullest information as to comparable work in other towns must be systematically obtained, as well as the conditions obtaining with private employers in the city, and also with trade unions, where standard rates have been established. The formation of a "Commercial Department" for obtaining and collating such particulars is an absolute necessity. This would probably lead to a similar arrangement in other cities; and there would thus be a constant interchange of actual facts. We recommend that a "General Purposes Committee" be appointed as one of the standing committees of the Council, with power to act in regard to all the foregoing matters. In our opinion such Committee must be entrusted with the general arrangements as to labour in all departments of the Corporation. To enable this to be carried into effect, it is necessary to appoint a "Commercial Manager" to carry out the work above indicated. One important result of such appointment would be to eliminate casual employment, and to render permanent as far as possible the positions of men who are efficient under the Corporation.

After careful consideration of all the matters connected with the recent strike, and after thorough inquiry into the work of the various labour employing departments of the Corporation, the Committee make the following recommendations to the Council:—

1.—That a General Purposes Committee be formed; and that the Committee consist of seven members.

2.—That the City Council delegate to such Committee full power to deal with all matters arising out of or in connection with—

(*a*) The appointment, control, and dismissal of all workmen.

(*b*) Wages, hours, and conditions of labour of all workmen.

(*c*) The distribution and supply of labour to the various departments.

(*d*) The reorganization of the Cleansing and Highways Departments.

3.—That Mr. J. B. Hamilton be appointed Executive Officer of the General Purposes Committee, at a salary of £500 per annum, to act under the instructions of the Committee in the above duties, and in such other duties as may from to time be delegated to the Committee.

4.—That only applicants who are found suitable and are certified as fit after being medically examined shall be permanently engaged.

5.—That no one in an official position shall be a member of a union existing among those over whom the official is placed.

6.—That the City Council meet once in each quarter, and that the necessary consequential alterations be made in the Standing Orders and delegations of duties to committees.

The report deals fully with the events connected with the strike—which arose, of course, over the refusal of the Corporation to concede a demand for an all-round advance of 2s. a week in wages. A section of the report is devoted to the work of the various departments affected by the strike. The electrical power station, it is pointed out, was maintained in a state of efficiency throughout the strike; and, as a matter of fact, 30 per cent. more electricity was sold during the period than in normal times, though this could not to any appreciable extent counterbalance the loss on the Gas Department. Attention is called to the wilful damage to street-lamps and to the enormous waste of gas due to the lamps being maliciously turned on without being lit. It is clear, the Committee add, that a saving of £6000 would be effected annually in connection with the lighting of the gas-lamps of the city if an automatic system of turning the lamps on and off were generally adopted. The total cost of equipping the city with such a mechanical system would be approximately £19,000. With regard to the lighting of the electric arc lamps, these could be fitted with automatic controllers at an expenditure of £500; and this would bring about an annual saving of £500 on current used.

Dealing particularly with the gas-works, the Committee make the following remarks: "Considerable difficulty was experienced in connection with the Meadow Lane and York Road works. The Committee do not hesitate to say that from the commencement of the strike, and during its progress, they were convinced that the managers and foremen at these works, particularly at Meadow Lane, were not fully assisting the Committee to produce a sufficient supply of gas. The Committee have evidence that malicious attempts were made to injure the engines and boilers. The whole time of an engineer who had volunteered was for a period taken up in preventing them from being tampered with. It is also to be regretted that attempts were made to injure voluntary workers. The Committee found that gas produced at these works, and also at the New Wortley Works, was to a considerable extent being maliciously blown through pipes that had been opened to the air. This could only have been done with the object of wasting gas and reducing the supply available for use in the factories of the city. It is greatly to be regretted that none of these traitors were detected. The Committee are convinced that much of the plant is obsolete; and, as a result of the men withdrawing their labour, many of the retorts, which had previously been in a very indifferent condition, became completely broken down. It may be possible for these to be partially repaired; but the Committee are credibly informed that it is possible to introduce improved forms of gas plant which will return the whole capital expenditure in about four years. It is desirable that this should be done at the earliest possible moment, and that meantime little expenditure should be incurred in patching up the old retorts. In this connection it may be pointed out that by the introduction of one vertical retort plant at Meadow Lane, 1¼ million cubic feet of gas were produced daily by twelve men, as against sixty men under other processes obtaining in the works. We therefore consider it necessary that the whole of the gas plant should, by the adoption of the most efficient equipment, be thoroughly modernized."

In other departments the way to secure large savings is pointed out; and the Committee warmly defend the attitude taken up by Mr. M. E. Sadler, Vice-Chancellor of the University, regarding the strike.

Reduction in Price at Cuckfield.—The announcement was made at the annual meeting of the Cuckfield Gas Company that the Directors intend to reduce the price of gas by 3d. per 1000 cubic feet as from the end of the current quarter. Dividends of 7 per cent. on the ordinary and 5 per cent. on the preference shares were declared.

Bradford Gas Committee and a Proposed Show-Room.—It was announced by the Town Clerk at the opening of the proceedings at the last meeting of the Bradford City Council that several letters had been received from Tradesmen's Associations protesting against the Gas Committee opening show-rooms in Darley Street. At a later stage, Mr. J. H. Barraclough, when moving the adoption of the minutes of the Gas Committee, asked permission—which was at once granted—to withdraw the minute with regard to the opening of the show-room. He said he withdrew the minute in deference to communications received by individual members of the Council, and a request sent to the Committee that a deputation should be received on the matter.

SEVENOAKS AND THE EDENBRIDGE GAS BILL.

At the Meeting of the Sevenoaks District Council last Thursday, the Committee appointed to consider details of the Edenbridge and District Gas Bill made various recommendations as follows:

To accept a reduction in the original capital of £8000, additional capital £7000. Failing a common clause being inserted in the Bill, the Company to be required to provide a 14-candle power illuminating test. To accept a clause leaving it open for other companies to apply for lighting powers in respect of Chiddingstone, Cowden, Hever, and Penshurst villages, if the Edenbridge Company fail to light these centres within five years of the passing of the Act. To accept an undertaking by the Directors of the Company to adopt a similar method of treating tar to that used by the Tonbridge Gas Company, or some equally satisfactory method.

The Committee added that the Directors could not accept an equality clause; and the Committee decided not to press the point. The Directors were willing to accept a protective clause with regard to the making and breaking of roads; they had no objection to the settlement of any disputes by arbitration, and agreed to reduce the charge for a stand-by supply from 25s. to 12s. 6d. per quarter; and they agreed to the inclusion in the Bill of the customary provisions with respect to street lighting.

Most of the members of the Committee expressed the opinion that the Directors had met the Council to a considerable extent. They recommended the Council to approve of the amendments and not to proceed further with their opposition to the Bill.

An amendment was moved to the effect that, as the Company had refused to give way on two vital clauses, the Council, in the interests of gas consumers, proceed with their opposition to the Bill.

After a discussion, however, the amendment was lost by 14 votes to 7; and the Committee's report was then adopted.

GAS PROFITS AT LEICESTER.

The Question of Allocation.

Some discussion as to the allocation of gas profits took place at a special meeting of the Leicester Town Council last Tuesday, when a report of the Gas Committee was submitted, which stated that the net profit for last half year, after payment of interest, was £19,740.

Alderman SMITH, in introducing the report, said that, allowing for sinking fund charges, a balance of £11,677 remained, which, added to £16,801, the balance of net profit for the half year ended June 30, made a total of £28,478 applicable to the district fund at the close of the current financial year, or available for increasing the present reserve fund of £28,568. The Committee recommended that £8000 be placed to the reserve fund, and that the balance of £20,478 be applied to the district fund. He remarked that he would like to say a few words as to the disposal of the profits made and as to the prospective profits for the coming half year. Dealing with the past half-year's accounts, it would be noticed that at the end of December there had been an expenditure on capital account of £33,663, and £7009 for the purchase of property. The outstanding feature had been the heavy increase of £7334 in the cost of coke and oil; and this, added to the increased cost of £10,616 for the June half year, made the total increase for the year £17,950. The balance carried forward to profit and loss account was over £5000 less than in December, 1912; but it was only right to say that at the former period the whole of the purchases of gas-meters were charged against the profit and loss account. On the whole, the year had been rather better than he forecasted six months ago; the total profit being £28,478, compared with £44,475 for 1912—showing a decrease of £15,997. This result was much better than the results attained by most of the corporations who had passed through the same difficulties; and it had been achieved without any attempt to raise the price of gas. As to the prospective profits for the current half year, it was very difficult at the present juncture to make any reliable forecast. The increased cost of coal, to which they were already committed for the current half year, would amount to £7300. They hoped in the new contract to effect some saving in this direction; but the demand for coke and residuals was very low indeed in Leicester. He did not think he would be justified in saying that the Council should expect more than £25,000.

Mr. HILTON seconded, and, referring to the depressed state of the coke market, said the supply had been so great that unfortunately the price had gone down. He hoped that in future years the Council would support the Committee in their efforts to build up the reserve fund to a substantial amount. Since they had had charge of the undertaking, the Gas Committee had contributed £827,725 to the relief of the rates. It was not altogether good business not to contribute to the reserve fund. He hoped the Council and the ratepayers would not expect so much in future years for the relief of the rates. If things turned out brighter again, and they had large surpluses, they ought to be allowed to reduce the price of gas rather than take such large sums for the relief of the rates. The high-pressure gas had paid, and had paid well; and the clear amount for this year would be £500.

Alderman TOLLINGTON moved, as an amendment, that the sum of £5000 out of the profits be carried to the gas reserve fund, and that the balance, £23,478, be applied to the district rate. Every member, he said, would agree as to the necessity of building-up a substantial reserve fund. But on this occasion he hoped the Council would accept the amendment, and so save any increase in the rates. If they accepted the Gas Committee's report, they must of necessity increase the rates a penny in the pound. Considering the substantially increased demands made on the ratepayers last year, it would be unwise in the interests of the whole community to make a further advance of even a penny.

Alderman SMITH stated that he had overlooked the loss on residuals which might accrue in the coming year, which he thought would reduce the estimated profits to £20,000.

Mr. KELLY thought the suggestion of the Gas Committee was the proper course to be pursued.

Mr. SHERRIFF, in supporting the amendment, said that when there was an abundance of profits they put nothing to the reserve fund; and yet in a year when the profits were less, they wanted to carry 30 per cent. to reserve.

Mr. MURBY said the gas reserve fund was the lowest reserve fund of any works in the country of the same size; and it was not a credit to the Corporation. The lean years, he thought, were to come. He supported the action of the Committee.

The amendment was carried by 39 votes to 16; and the report as amended was then agreed to.

BIRMINGHAM GAS FITTING DEPARTMENT.

The annual dinner of the City of Birmingham Gas Department Fitters' Hospital Saturday and Benevolent Society took place at the Colonnade Hotel, Birmingham, last Saturday week. The President of the Society, Mr. S. R. Barrett, occupied the chair, and was supported by Mr. R. S. Hilton (the Secretary and Manager of the Gas Department), Councillor J. V. Stevens, J.P., Mr. Charles Breeden (the President of the Master Gas-Fitters' Association), and Messrs. R. J. Rogers, L. A. Long, and R. G. Marsh. After dinner a capital musical programme—to which many members of the Fittings Department contributed enjoyable items—was much appreciated by those present.

In proposing the toast of the Benevolent Society, the Chairman urged the younger fitters to devote their energies and abilities to improving their knowledge by studying at technical classes and by other educational means, so as to qualify themselves for more responsible positions in the future. The President stated that it was quite possible for any fitter's boy by the merit of his knowledge and character to rise to any position in the Department. In responding, Mr. Rogers stated that the success of the Society was in no small measure due to the practical interest and support which the President had always shown in its affairs. Mr. L. Sturdy, in proposing the toast of "The Visitors," referred to the amicable relations existing between fitters employed in the Gas Department and those working for master gas-fitters in the city. Councillor Stevens mentioned that he was the oldest member of the Gas Committee in point of service, and that he always did his best to guard the interests of the gas-fitters in the city. He was pleased to hear from the proposer that the whole body of gas-fitters of the city were quite satisfied with the conditions now prevailing for employment by the Gas Department. He emphasized the necessity of this satisfactory state of affairs being maintained, in order that the best services should be rendered to the ratepayers by the department. Mr. Charles Breeden referred to the need for concerted action on the part of fitters employed by the master gas-fitters of the city and the Corporation Gas Department fitters, in order that the active competition of electricity could be properly combated. Mr. Hilton spoke of the necessity of the gas-fitters doing all in their power to increase their technical knowledge, and mentioned that in connection with the newly-arranged examination for gas-fitters by the City and Guilds of London Institute arrangements had been made for a three years' course of lectures to be given at the Municipal Technical School, Birmingham, for the fitters of the department.

In the course of the evening a presentation of a gold watch was made by the President, on behalf of the gas-fitters of the department, to Mr. H. Newey, a fitter who is shortly leaving for Australia.

COST OF THE LEEDS GAS STRIKE.

There was a reference in last week's "JOURNAL" [p. 675] to a statement in the Leeds City Council by Alderman George Ratcliffe (the Vice-Chairman of the Gas Committee) as to the effect of the recent strike on the finances of the gas undertaking. On the day after the meeting, the "Yorkshire Evening Post" contained the following paragraph on the matter.

The long-suffering Leeds ratepayers received a rude shock yesterday, when Alderman Ratcliffe announced at the City Council meeting that every penny of the Gas Department's profits (estimated at £30,000 for the year) had gone as a consequence of the strike; while up to March 31 there would be a further deficiency of from £12,000 to £13,000. A loss of £43,000 is bound to have a serious effect on the rates for next year, for it will react in a double sense on next year's budget; and Alderman Wilson must be burning much midnight oil in an effort to cope with this incubus in his estimates for next year. The loss, of course, will have to be made up in the budget for the coming year; while allowance will also have to be made for a probable deficiency in the same direction next year.

Alderman Ratcliffe, in conversation with our representative, remarks our contemporary, said the aim of the Gas Department must now be to encourage the use of gas for fires, heating, lighting, and numerous other things. With the present state of affairs, it was futile for consumers to anticipate a reduction in the price of gas. Such a thing would not be possible until there was a more universal use of gas. The greater the consumption the lower the price it could be sold at. The new Gas Manager (Mr. W. B. Leech) was tackling the matter in a businesslike and very praisworthy manner; and if the department was given the opportunity to develop on the lines they wished, they could look hopefully to the future. Alderman Ratcliffe went on to say that, in his opinion, the Gas Department had never yet had a chance to extend and improve itself in comparison with the Electricity Department. Last year, for example, the Gas Department had £40,000 taken from it; and this system had been followed for the past twenty years, when these profits ought to have been used to bring the department up to the highest pitch of efficiency. They had known all along what was required; but, of course, they had been in the hands of the Council.

GAS AND ELECTRICITY AT DOVER.

In the course of the procedings at the recent meeting of the Dover Gas Company [see *ante*, p. 671] their Consulting Engineer, Mr. W. R. Herring, M.Inst.C.E., took the opportunity of making some remarks on the gas and electric supply of the town—this latter under the control of the Corporation. He commenced by saying he thought the Company were to be sincerely congratulated upon the outcome of a trying period—a period which had necessitated some of the greatest and best managed gas companies dipping very deeply indeed into their reserve funds. The price of coal and the cost of labour had all added to the cost. The workers now received more money and could spend more money; and they were not the least to appreciate the domestic facilities which gas afforded in the household. He hoped when he was at Dover a year ago to have now seen the signs of a very considerable development in the town; but he was sorry to say this had not come about. There were great possibilities for Dover from an industrial point of view. There was no doubt that Dover as a resort was (he was going to say) damned—if the word was not too strong. They had enclosed their beautiful bay with a stone wall, beyond which nothing could be seen. There were, however, great commercial possibilities in connection with the collieries in the district. But while they saw glowing articles written by great authors depicting what the future had in store for the district, he must say he was sorry that the development was so slow. The opening-out of the collieries would bring in a class of wage-earners—the highest in the country. The collier earned big pay and he spent it. While they heard talk of garden villages and towns in the vicinity of the collieries, they knew very well that the workmen would live in the town if they could. It was, he considered, lamentable that Dover should be receding in so far as its public lighting was concerned. Most towns were giving up electricity for gas, but Dover appeared to be giving up gas for electricity—not even because it was cheaper or because it was better. Berlin, within the last five years, had lighted 120 miles of their streets by means of high-pressure gas; and they were spending £50,000 a year in converting their electric lighted streets to high-pressure gas-light. Surely Dover must be mistaken in taking the step that had just been taken to put incandescent electricity in the streets in place of gas.

Objection to the action of the Corporation is not confined to the Gas Company and its officials. The "Dover Standard" mentions that the Council have been considering the lighting question in connection with some new workmen's cottages which they are erecting at the pier. The unusual course of restricting the tenants to the use of electricity for lighting purposes has been taken; and the question of how the charges should be made had to be considered. In these cottages there would probably be a difficulty about collecting the lighting account quarterly; so it was decided to experimentally put blocks of four cottages on to one meter, and to charge the tenants 6d. weekly for lighting—to be collected with the rent. The tenants will have cheap lighting; but whether the Council will have a good bargain is another matter. The arrangement is such that the tenants can take an unlimited supply of light for their 6d. weekly; and this certainly will not pay the Council, while it is also unfair to other users of electric light in the town. As to the public lighting, there is no question that under the present arrangement Dover is not lighted nearly so well as it was with incandescent gas; and the Council will, the local paper remarks, sooner or later have to reconsider carefully the street lighting question.

DUBLIN ELECTRICAL UNDERTAKING.

"Sovereigns down a Bottomless Pit."

At a Meeting of the Dublin Corporation last week, the Lord Mayor (Dr. Sherlock) moved, and Mr. J. J. O'Neill seconded, the adoption of a report of the Electricity Supply Committee recommending that application be made to the Irish Local Government Board for a further loan, amounting to £77,000, for the extension of the undertaking. His Lordship said this meant a further development of the concern without any further charge on the rates.

Alderman Kelly moved an amendment that the matter be postponed for a month, when the estimates would be before the Council; and Alderman M'Walter, in seconding, said he saw no sign of the electricity undertaking being a relief to the rates. It was simply, he declared, a case of throwing sovereigns down a bottomless pit. He thought £700,000 was enough to sink in this way, and that they should not be asked to add to the amount. The amendment was defeated by 37 votes to 7, and the recommendation was adopted.

The report opposed the taking off of the 10 per cent. added to the rates of charge for electricity three years ago; and an amendment that the 10 per cent. be reduced to 5 per cent. was defeated by 35 votes to 16.

The "Irish Independent," in a comment on the rating of Dublin, says: "After all the rosy promises which were made about the relief which the surplus from electric lighting would bring to the ratepayers, it is now stated that a rate of 1½d. in the pound will be proposed in relief of the undertaking. In explanation of this impost, it is said that it has become necessary to form a reserve account. It is obvious that, as a commercial enterprise, the electric lighting system has so far failed to yield a profit, and that the 'surpluses' paraded with such a flourish are fictitious. There must be a lack of business management somewhere. For years the consumers have been paying an additional 10 per cent. to the Corporation for their light. On the basis of the estimated private consumption for the current year, this 10 per cent. is equivalent to a rate of over 2½d. in the pound on the entire city. It means, of course, much more to the individual consumers. Five years ago, the Lighting Committee stated with emphasis that the increase of 10 per cent. was to be of a 'temporary nature.' At the same time, they recommended the discontinuance for twelve months of the 25 per cent. discount to new consumers. Unless the Corporation attach the

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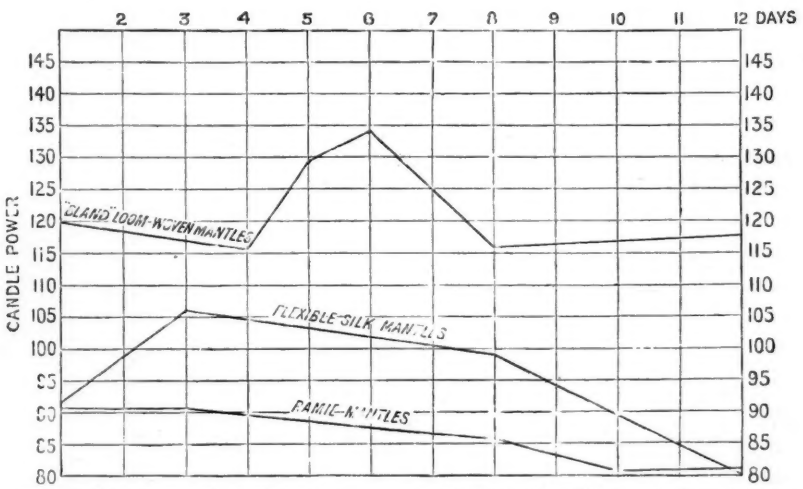
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same meaning to the word 'temporary' as the Civil Service authorities, the temporary period should have by this time expired. Apparently the consumer who expects that this percentage will soon be taken off deceives himself. If it had not been put on, the total charge on the rates would be 4d. in the pound."

BLACKBURN GAS-WORKERS DISSATISFIED.

There is a possibility of the trouble between the Blackburn Corporation and those of their employees who were on strike recently being re-opened on the question of reinstatement. Though it is four weeks since the terms of settlement were arrived at, it is reported that there are still 52 men who have not been taken back; and it is asserted by the men's officials that these are not in any way affected by the reorganization proposals agreed to by the men's representatives. They are in the following departments: Gas-works, 5; lamps, 7; waterworks, 1; baths, 2; highways, 16; cleansing, 6; tramways, 10; electricity, 5. A discussion on the question took place at a meeting of the Executive Committee of the Lancashire District of the National Union of Gas-Workers and General Labourers; and it was decided to instruct Mr. J. R. Clynes, M.P., the Lancashire District Secretary, to inform the Corporation that if they did not carry out the terms of settlement the men would not do so either.

Interviewed on Friday, Mr. Clynes stated that this alleged breach of contract would tend to prevent the smooth working and loyal observance of the terms of settlement. There was a strong feeling on the part of the men that, if the Corporation did not conform to the spirit and understanding of the terms of settlement, they should not be under any obligation to adhere to their promise in the matter of reorganization. Asked whether the men were prepared to strike again in the event of their claims not being met, Mr. Clynes said this position had not been considered, but he intended to make representations before long to the Corporation authorities on the subject. When the strike was settled, it was expressly agreed that all the strikers should be taken back except those affected by the reorganization and seasonal jobs, and one or two individual cases that were mentioned.

A meeting of the Special Strike Sub-Committee is to deal with the matter early this week.

Maryborough (Queensland) Gas Company, Limited.—The profit of this Company for the half year ended the 31st of December, including the balance brought forward, was £1150; and at the meeting of shareholders on the 17th ult. the Directors recommended the payment of the usual dividend of 6 per cent. per annum, free of income-tax. This amounted to £825, and left £325 to be carried forward. On the same occasion, a proposal was submitted to increase the Company's capital from £30,000 to £50,000.

ALLOCATION OF TRADING PROFITS AT WARRINGTON.

At the last meeting of the Warrington Town Council, in presenting his sixth annual budget, Mr. WILKINSON said the proposal was to levy 8s. in the pound, the same as last year. The extra expenditure of the various Committees, however, called for £5610 more than before. It was proposed to raise the increased expenditure by taking £500 from the Water Department, and the remainder from other departments. It was very gratifying to find that all the undertakings of the Corporation—gas, water, tramways, &c.—were contributing to enable them to levy the same rate as last year. He offered his congratulations to the officials of the various departments who had endeavoured with so much success to keep the expenditure well within the limits of the estimates for 1913-14.

Councillor OSBORNE said he did not agree with Mr. Wilkinson that the trading concerns ought to be called upon for contributions towards the relief of the rates. He was surprised to find that even the water undertaking had to provide £500 this year. It was a wrong principle, for it appeared to him that the Council ought to supply water on the cheapest possible terms, and thus give the advantage to the users. With regard to the Gas Department, they were assured a short time ago that they would deplete the funds if they made certain concessions to consumers, and that they might possibly have forced upon them an extra shilling rate. They even heard from one Alderman that coal was going to cost the department £3000 more in the coming year, and that the sale of bye-products was expected to yield about £2000 less. Yet the gas undertaking was actually providing more than £13,000 for the relief of rates.

Alderman JOHN EVANS pointed out that only £10,000 of this amount was actual profit for the year. The balance had been taken from money in hand.

Councillor OSBORNE (continuing) contended that the Finance Committee were drawing upon the resources of the Gas Department. If it could contribute £13,000 to the relief of rates, it ought to be in a position to reduce the price of gas to the consumers. The Electricity Department, which was barely self-supporting, was to be called upon for £1000. He argued that this method of disposing of profits was bad finance, and that the time was coming when each department would have to recognize some settled basis of contribution. The system he advocated had been adopted and worked well in Manchester.

In the end, the resolution fixing the rates at 8s. in the pound was adopted.

Mr. William Ford, the Engineer and Manager of the Stockton Gas-Works, has been authorized to prepare plans for the extension of the carbonizing plant. Mr. Ford points out that the matter is of extreme urgency, as, in the event of the least failure of the retort-settings, an adequate supply could not be maintained.

The GUIDE-POST of PROGRESS

YEAR 1904.

NOTABLE FOR THE INTRODUCTION OF THE FIRST HOT-WATER 'CIRCULATOR,' THE WILSON.

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YEAR 1913.

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THE CIRCULATOR FOR ALL KINDS OF WATER.

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STRIKE AT MESSRS. FLETCHER, RUSSELL, AND CO.'S.

Statement of the Men's Case.

From inquiries made at the week-end, there appeared little likelihood of a settlement of the strike at the works of Messrs. Fletcher, Russell, and Co., Limited, at Warrington, which involves upwards of 1000 workpeople, and which has now been in progress for more than a fortnight. There was no attempt at negotiation during the week; each side apparently pursuing a waiting policy. The men have been explaining their case by means of meetings at various large works.

What is described as an "official statement" of the men's case was issued on Friday evening. It alleges that several grievances affecting the wages of the men have occurred recently; and in every case the firm have refused to meet a deputation of the men concerned, but insist that the men should make their complaints individually. This, it is said, is "in direct contradiction to what the firm had done consistently for more than two years. The nature of the work in this industry results in a constant change of prices; and it is absolutely necessary to have a permanent Committee inside for the revision of these prices." "Before taking the course adopted," the statement proceeds, "the men exhausted every conceivable method of conciliation. In January a mass meeting was held to discuss the notice passed by the firm, and on that occasion the men's leaders undoubtedly restrained the men from taking action, because they (the leaders) were under the impression that the firm would again meet them in conference in an endeavour to arrive at a settlement. Some time later a further mass meeting of the men was held, at which it was agreed to instruct the officials to write demanding that a deputation be met. The firm replied that they could not brook interference with the management. It is obvious that, in their desire not to brook any interference of the men with the management, the firm are prepared to deny the men common justice—the right to state their case when it affects their pockets."

JOHN WRIGHT AND EAGLE RANGE, LIMITED.

The Annual Meeting of the Company took place last Wednesday, at the Grand Hotel, Birmingham—Mr. H. JAMES YATES presiding.

The CHAIRMAN, in moving the adoption of the report and accounts [some figures from which were given on p. 686 of last week's "JOURNAL"], said the profit they were able to show this year was a very small advance on the previous year, though their turnover had been enormously increased. When he told them that this year one section of their turnover, running into six figures, not only yielded them no profit, but did not bear its full share of expenses, they would see that the difficulties in maintaining the progress of the business were by no means small. In the growing stress of competition buyers all expected considerably more for their money; and against this they had had increased wages to face. Materials had also cost them very much more; and the advance in prices which they had had to charge their customers by no means covered their increased costs. Their burdens, apart from increased cost of labour and raw materials, were becoming greater in every direction. The National Health Insurance was a big annual item; and then they had increased railway rates—also a very heavy burden. The arbitrary treatment that was meted out to English manufacturers by the railway companies had become a most serious matter; and the conditions were so onerous that in the case of some classes of goods it became almost impossible to manufacture and deliver to the customer with the chance of any profit at all. He referred more particularly to the question of owner's risk rates. Of course, any manufacturer who took advantage of the owner's risk rates knew that with the cheaper rate he took the risk of breakage; but at the same time the natural obligation on the railway company to handle and carry the goods with reasonable care remained. Unfortunately, they knew to their cost that this reasonable care was too generally not taken. The damage done in a number of cases gave clear evidence of nothing less than culpable negligence. But before the manufacturer could get any redress from the railway company, he had to prove "wilful misconduct on the part of the company's servants." In other words, he would have to follow every consignment over the country, and actually see the railway company's servants committing the wilful misconduct. As a recent instance—only one out of many hundreds—a certain customer ordered 24 stoves. These were despatched in the usual way, and all arrived broken. They replaced them, and a number were broken again. These they also replaced; and this went on for a number of times. In all, they had to send 60 stoves to get 24 good ones delivered to their customer. They took the matter up with the railway company, but could do no good locally. He then wrote personally to headquarters, but with no better result. The alternative offered, of course, was: "Pack your goods and send at company's risk." But in practice this alternative was not really open to them. A large section of their goods was so cut in price that the cost of the packing demanded by the railway company and the extra rate would involve a loss. Indeed, when they had made trials by packing and consigning goods at company's risk, they found that the very fact of the nature of the goods being concealed by the packing from the railway men, coupled with the weight of the cases, had led to their being smashed more badly than ever. They had even gone the length of sending consignments, part of which had been packed in boxes and consigned at company's risk, and part sent in the usual way at owner's risk; and the breakage had been less with the unpacked than with the packed goods. It was to be hoped some good might come of the inquiry by the Commission now sitting. In these days of competition and growing expenses, one had every sympathy with the railway companies' putting their heads together; but it must be remembered that railway companies were not ordinary traders. They were for the public service. They had practically a statutory monopoly, and should therefore be more effectively controlled in their treatment of the public. As to

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the balance-sheet, their position continued strong and healthy. They had created substantial reserves, and this recalled the fact that the rate of dividend they paid was actually by no means so large as it seemed. When these reserves were borne in mind, it would be seen that the capital on which the rate was calculated represented only a portion of the total capital employed in the business.

Mr. G. G. BRODIE seconded; and the report and accounts were adopted.

DAVIS GAS-STOVE COMPANY, LIMITED.

The Fourteenth Annual General Meeting of the Company was held last Thursday, at the Cannon Street Hotel, E.C., when there was presented the Directors' report, which has already been noticed in the JOURNAL [*ante*, p. 685].

The CHAIRMAN (Mr. H. Addis Price), in moving the adoption of the report, said the business of the Company had shown a very satisfactory increase during the year in all departments—in fact, it had eclipsed all previous records. That the net profits had not increased in the same proportion was due solely to the greatly increased cost of materials and advances in wages. The Directors had thought it advisable to start a provident fund, for the benefit of every employee; and to this it was proposed to allocate from the year's profits the sum of £2000. As the accommodation at Queen Victoria Street was no longer sufficient for the business, arrangements had been made to shortly occupy spacious premises in Oxford Street. They had recently acquired the business of the Nautilus Fire Company, Limited, who dealt in artistic fires known as the "Nautilus," either for coal or gas. A few years ago, the Davis Company centralized their Falkirk and Langley foundries at the present works in Luton; and the Directors considered the time had now arrived for moving the Camberwell works there too. It was not, however, intended to transfer the whole of the works at once. In conclusion, he pointed to the fact that the Company's shares are now quoted in the Stock Exchange "Official List."

Mr. CYRIL G. DAVIS, in seconding the motion, referred to the large amount of research and experimental work undertaken by the Company's technical department at Luton. This, he said, had been one of the most important factors in building-up the business. The Company had been able to revolutionize the construction of gas-fires; and, thanks to the energy of their technical staff, they had devised what might be termed "the original hygienically perfect gas-fire." Until they completed this work it was not possible to fit any gas-fire without adding lengths of flue-piping as a hygienic safeguard; and even then there were no means of knowing how much flue-piping each particular fire needed to ensure the whole of the products of combustion being carried away. In addition to only manufacturing fires which were hygienically perfect, the Company were also successful in devising a simple means of testing fires for hygienic efficiency, known as the "Shadowgraph," which had been adopted as the standard test by a large number of gas undertakings in this country and abroad. Though their own efforts had been mainly responsible for the success of the past year, he was anxious to remind the shareholders of the work of that energetic body the British Commercial Gas Association. There was no doubt the Association's extensive educational and publicity work had been of great help to the Company in increasing their sales.

The report was adopted.

RICHMOND GAS STOVE AND METER COMPANY, LIMITED.

The Twenty-Third Annual General Meeting of this Company was held at Warrington last Tuesday.

The CHAIRMAN (Mr. T. Dwerryhouse) said the year covered by the report and balance-sheet had proved a prosperous one; the output being largely in excess of that for the previous year. But owing to the increase in wages and in the prices of almost all materials and finished work incidental to their trade, the goods had cost more to manufacture, and the profit derived from them had not increased proportionately with the growth of the business. The Directors purposed to put up further buildings at Grappenhall, which would give increased accommodation. The balance standing to the credit of profit and loss account (less debenture interest and contingent reserve), including the amount brought forward, was £36,720, against £35,024 the previous year. This the Directors recommended should be appropriated as proposed in the report [*ante*, p. 686], the adoption of which he moved.

Mr. H. M. THORNTON (Vice-Chairman and Managing-Director), in seconding the resolution, said the event of the year under review as affecting their business was the National Gas Exhibition organized jointly by the gas authorities and the manufacturers. The firm took a very prominent part, both financially and otherwise, in the exhibition; and it was his privilege to be Vice-Chairman of the Executive Committee. The exhibition was an undoubted success. It was visited by some 200,000 people; and he was satisfied that for a long time to come benefit would be derived from the educational results which such a demonstration of modern and up-to-date appliances must produce in the minds of gas consumers. The continued success during the year that is past, and the steady advancement of the British Commercial Gas Association were also to them matters of considerable moment. The Association had for its object the provision of an annual fund for advertising gas. This fund (to which the Company subscribed) was gradually growing; and the activities of the Association were becoming greater as a result. Speaking as a member of the Executive Committee, he regarded the future of this great organization with every confidence, as well as its influence on the prosperity of gas undertakings and of the manufacturers of gas plant and appliances. It had become fully recognized by the gas industry on one side and the manufacturers

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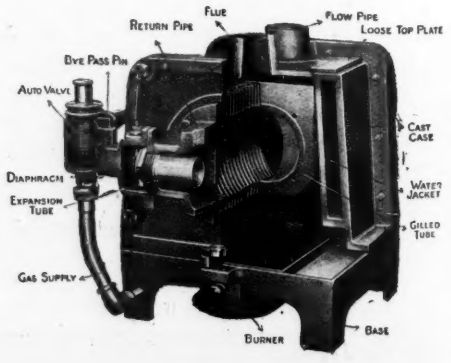

of gas appliances of all descriptions on the other, that co-operation in many ways was to the advantage of both; and the good relations between buyer and seller which had become so satisfactory in recent years, and which were evidenced by the joining of forces in connection with the National Gas Exhibition and the British Commercial Gas Association, had greatly strengthened the prospect of a continuance of the prosperity of gas undertakings and manufacturers alike. Their Company had always considered it the best policy to specialize and concentrate all their forces on the requirements of the gas industry proper. They thought this was fully appreciated by their customers, and they realized that the firm had at their command an organization which produced only the best appliances for their use. As an instance of the advantage of specialization, the Compnny had, after several years of steady laboratory work, succeeded in effecting a very important and far-reaching change in the efficiency of the gas-cooker. This, coupled with the important advances they had made in recent years in gas-fires, water-heaters, and appliances for industrial uses, was enabling them to meet the more exacting requirements of the industry for articles scientifically made, economical in use, and easily maintained. The tendency of the time was for labour-saving apparatus; and with the gradual reduction in the price of gas, they could depend —allowing for the ordinary fluctuations of industry—on a constant demand for their manufactures.

Mr. J. A. RANSOME (Managing-Director), in response to a vote of thanks to the staff, remarked that it had been a very difficult year, not only in the labour world, but also in the purchase of materials.

BRISTOL WATER AFFAIRS.

At the Annual Meeting of the Bristol Water-Works Company last Saturday week, the Chairman (Mr. H. Napier Abbot), in moving the adoption of the Directors' report [*ante*, p. 596], alluded to the Company's Bill being promoted this session, and also to their recent satisfactory case in the House of Lords. He said the Directors had thought it right and necessary to present to Parliament a very moderate Money Bill for the raising of £100,000 and £20,000 borrowing powers; but the Corporation were petitioning against it—reasonable as the Bill was. The Corporation had never forgiven their flinching in 1876 from buying the Company's undertaking, and had never forgiven itself for the non-success of the competitive scheme brought forward in 1887. And then, again, in the matter of the Yeo, the Corporation had pursued the Company relentlessly in both Houses of Parliament. This sort of thing the Company had been accustomed to from the Corporation; indeed, after forty years of such animosity, the Directors were not taken by surprise by the present opposition. They, however, intended to put up a fight—he might say, a good fight—and believed that they had nothing to fear, when they got to Parliament, as to any charge of neglecting their duty to the city. The opposition they were confronted by was virulent, hard, and unworthy. Proceeding, the Chairman alluded to the recent successful appeal to the House of Lords. The Bristol Board of Guardians haled the Company before three judicial tribunals, finishing with the House of Lords, with the natural lightheartedness and cheerfulness usually evinced by bodies which had the public purse to draw upon. In the end he expected that this public body—stewards of the ratepayers' moneys—were rather sore. The Company, too, were sore, because, although they had won and obtained taxed costs, there was still a balance which would cost the Company something. It, however, would come out of the renewal and contingency fund. The shareholders, in his opinion, were greatly indebted to the line taken by their Solicitor, Mr. Edward Gerrish, and to the excellent assistance always given by their Engineer (Mr. J. A. Macpherson, B.Sc.) in constructive and other works. It was unnecessary to say anything in praise of their Secretary and General Manager (Mr. A. J. Alexander); but of that official's son, Mr. William Alexander, he could not speak too highly. He was coming on splendidly in the business of the Company.

A report of the Parliamentary Bills Committee, recommending a petition against the Company's Bill, was adopted by the Bristol Town Council at a meeting last Tuesday.

The report was presented by Alderman George Pearson, who said the Company's Bill was for raising £100,000 additional share capital, and debenture stock to one-fourth of this amount. The Committee thought these powers too large, and that they should not be granted while unexhausted borrowing powers remained. Moreover, in the view of the Committee, the increase of capital tends to increase or prevent the reduction of charges for water. In these circumstances, the Committee thought the Corporation should oppose the Bill, and should seek to reduce the Company's charges by making the basis of rates for a domestic supply the net rateable value of the house, and not the rent, as at present—making them supply water free for one bath in a small house, and at a charge not exceeding 7s. 6d. a year in others. The Committee also suggested that the differential rate for high levels should be abolished, and that the Company should be required on demand to supply water for domestic purposes to all dwelling-houses, whether private or not, and to public institutions, such as asylums and workhouses, for domestic or other purposes, on reasonable terms and conditions. The question of the supply of water to all houses, whether private or not, arose out of the recent remarks of the Lord Chancellor in giving judgment in the House of Lords. After these remarks, the Committee thought that there was no alternative but to call the attention of the Council to what was going on. It was clear that the Lord Chancellor considered there was a defect in the legislation of 1862; and if a change should be made, it should be by the persons who made the blunder—the House of Lords or the House of Commons. They therefore sought to raise the question before Parliament.

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NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

At the meeting of the Cleaning and Lighting Committee of the Edinburgh Town Council, a proposal was brought forward by Councillor Stevenson that a report should be obtained concerning the desirability of lighting the whole of the streets within the city area with electricity. This proposition is the outcome of the letter written by Mr. Masterton, the Engineer of the Edinburgh and Leith Corporations' Gas Commissioners, in which they offered to supply high-pressure gas for public lighting at an inclusive charge of £7 per lamp; this being £2 cheaper than the price at present charged for electric lighting. It is difficult to see the point in the proposition, in view of the lower price at which gas can be supplied; the light from the lamps so supplied being guaranteed as superior to that given by the electric lamps. If Edinburgh wishes to be up to date, it will have to follow the example of the "Little Village" of London, and extend the use of high-pressure gas for street lighting.

Plans for the new vertical retorts to be erected at the Irvine Gas-Works were presented at the last meeting of the Dean of Guild Court. The retorts are to cost over £5000, and will have a capacity of about 300,000 cubic feet of gas per day—about double that of the present retorts; and they will be housed in a structure 71 feet high.

The amalgamation of the Brechin and Edzell Gas Companies is proceeding satisfactorily. The scheme proposes that the gas shall be made in Brechin and delivered to the village of Edzell. A meeting of the shareholders of the Brechin Company has been recently held, when the recommendation of the Directors was accepted. The recommendation included the taking over of the Edzell concern and the laying of a gas-main there.

The question raised in the Summary Court of Glasgow, under the Factory and Workshops Act, against a draper who had failed to maintain a reasonable temperature in one of his workrooms reminds one of the difficulties which are put in the way of the proprietors of workshops and factories in the campaign against the flueless gas-stoves. The question, of course, narrows itself down to a matter of the quantity of carbon dioxide contained in the air, which, according to the last recommendation of a Departmental Committee, might be 15 parts per 10,000 in daylight, and 23 parts in 10,000 when artificial light, provided by gas or oil, is used. The proportion of the carbon dioxide which is produced by respiration, with its accompanying organic matter, is not defined, although this has a very important bearing on the question. If, therefore, flueless stoves or gas-heated steam-radiators can be employed without bringing the proportions above those mentioned, there is no risk in their use; and gas people should see that proper tests are made to show the advantages of such forms of heating where sufficient ventilation is provided.

Kilmarnock is not to be behind in the matter of vertical retorts. The Town Council have been discussing the report of a Sub-Committee, who state that the three tenders for continuous systems are: Woodall-Duckham, £13,500; R. Dempster and Sons, Limited, £13,750; Glover-West, £15,360. For the Wilson intermittent-continuous system, the tender is £12,800; Dessau intermittent system, £12,655; and the "Elland" (Dempster) intermittent system, £14,750. The Joint Managers (Messrs. Fairweather) advocated the intermittent system as most suited to their requirements; and the Sub-Committee have, after full consideration, agreed to this. They compared the two last-mentioned tenders; and the conclusion of their deliberations was to the effect that the system tendered for by Messrs. Robert Dempster and Sons, Limited, and known as the "Elland" system, appealed to them as being the most suitable for the requirements of Kilmarnock. The principal consideration is that the Elland retorts are 16 ft. 6 in. long, or 3 ft. 3 in. longer than those of the Dessau system; thus 60 retorts only are required, as against 72. The coke is expected to be better in quality, and 60 retorts are easier to work than 72. The tender for the "Elland" system includes a new chimney and foundations complete; while that of Messrs. Leech, Goodall, and Co., for the Dessau system, would require to have at least £1000 added to it to put it on the same basis as that of Messrs. Dempster. In addition, for the Dessau system they proposed to strip the entire roof, which would mean an increased cost in the replacement of broken slates. In conclusion, the Committee unanimously agreed to recommend the Council to adopt the principle of the intermittent system, and to accept the offer of Messrs. Robert Dempster and Sons, Limited, at the lump sum of £14,750. In the discussion which followed the submission of the minute, it was mentioned that the Managers had pointed out that the works were at the maximum, and something would have to be done to ensure the full supply of gas for next winter. They were also paid a well-deserved compliment by many of the councillors on the excellent advice given in the past. It was pointed out that the finding of the Committee was the recommendation of the Managers, and the hope was expressed that on this account the Council might adopt the minute unanimously. The Provost, before putting the matter to the vote, referred to the spending of £10,000 in 1909 for a new system of electrically worked charging and discharging machinery, when they were producing approximately 165 million cubic feet of gas; while in their last published balance-sheet the make of gas was 205 million cubic feet, and in May they expected to be told that it had reached 212 millions. The return from residuals had risen from £4700 in 1909 to a fraction over £10,000. Half the difference last year was due to the increased price of sulphate of ammonia; the other half from the coke. The minute was adopted.

While upon the subject of vertical retorts, it may be mentioned that the agreement with the Woodall-Duckham Company and the Hamilton Town Council has been adjusted. The Company are proceeding with the drawings, and the clearing of the ground is being carried out. The Committee agreed to recommend the application for a Provisional Order for further borrowing powers; and the Manager (Mr. Ballantyne) was instructed to report fully on all sums required to be borrowed for

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The boiler portion is cast entirely in ONE PIECE —no joints to leak.

Extra large man-lid for EASY CLEANING.

JOHN WRIGHT & CO.,
Eureka Works,
BIRMINGHAM.

the new plant. The Town Clerk was also instructed to bring the question of the Provisional Order before other Committees, in case there were other matters to be included in it. In the East of Scotland, the vertical-retort question at Kirkcaldy, after being reported upon by five separate gentlemen, has been delayed for a month on the motion of Bailie Leslie. Councillor Davidson brought a number of figures forward to try and prove that a gas-works on an entirely new site would be cheaper in the long run. He brought out the cost of the new works to £63,000, and that for the reconstruction scheme to £47,000—a difference of £16,000, which, at 5 per cent., is £960, or just the cartage bill.

The Musselburgh Gas-Works land purchase from the Town Council, mentioned in this column last week, has moved a step further. After the interim interdict was notified to the members of the Town Council, they decided, by seven votes to three (two members not voting), not to proceed further. The Town Clerk, however, said that if the Company came forward to say they would "pay the piper," then answers would be lodged. Now the Company have taken the advice of Mr. Frank Cooper, K.C. (who it will be remembered was one of the Counsel engaged in the Bridge of Allan arbitration), which is not to intervene and fight the interdict. It was then decided by a full meeting of the Town Council, without a division, to ask the opinion of Mr. Cooper and another advocate for advice, from the Town Council point of view. The question seems to be an important one for the Town Council, as, should they desire at any time to feu their property in other parts, the fact of the interdict over the presently desired portion will probably be used against them to prevent their disposing of any part of the links.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

The market for tar products has continued steady since the last report, and prices generally remain unaltered. Business has been done in pitch at 38s. 6d. per ton net; but the general quotation is 39s. per ton.

Sulphate of ammonia, 25 per cent., is still £12 per ton net and naked, with a moderate inquiry.

Tar and Tar Products in the Provinces.

The average values during the week were: Tar, 25s. 6d. to 30s. 6d. Pitch, east coast, 37s. to 37s. 3d.; west coast, Manchester, 36s. to 36s. 3d.; Liverpool, 36s. 6d. to 36s. 9d.; Clyde, 36s. 6d. to 37s. 6d. Benzol, 90 per cent., naked, North, 10½d. to 10⅝d.; 50-90 per cent., naked, North, 10⅜d. Toluol, naked, North, 10⅜d. to 11d. Crude naphtha, in bulk, North, 4⅝d. to 5¼d. Solvent naphtha, naked, North, 9¼d. to 9⅜d. f.o.b. Heavy naphtha, naked, North, 9d. to 9¼d. f.o.b. Creosote, in bulk, North, 3⅛d. to 3¼d. Heavy oils, in bulk, 3⅞d. to 4d. Carbolic acid, casks included, 60 per cent., prompt, east and west coasts, 1s. 0⅛d. to 1s. 1d. Naphthalene, £4 10s. to £10; salts, 55s. to 60s., bags included. Anthracene, "A" quality, 1⅛d. to 1⅜d.; "B," nominally ¾d. per unit, packages included and delivered.

Sulphate of Ammonia Prices in the Provinces.

LIVERPOOL, *March* 14.

Since the commencement of the week the aspect of the market for this article has changed completely, and prices have advanced materially at some ports. Not only has there been a considerable amount of purchasing to cover previous sales for March shipment, but there has also been a fair inquiry for early delivery from buyers abroad. The closing quotations are £12 10s. per ton f.o.b. Hull, £12 11s. 3d. per ton f.o.b. Liverpool, and £12 10s. per ton f.o.b. Leith. No more sales have transpired in the forward position, buyers refusing to make further purchases unless at a bigger discount off prompt prices, which manufacturers decline to entertain.

Nitrate of Soda.

This market continues steady, and holders on spot maintain quotations at 10s. 7½d. per cwt. for ordinary quality, and 10s. 10½d. for refined.

From another source, it is reported that a very quiet market has again been experienced during the past week in sulphate of ammonia, and really values are down to the extent of about 1s. 3d. per ton, though manufacturers are as yet unwilling to recognize this. However, we do not write the values to-day at more than £11 16s. 3d. for outside London makes; Hull, £12 7s. 6d. to £12 8s. 9d.; Liverpool, £12 8s. 9d.; Leith, £12 11s. 3d.; Middlesbrough, £12 7s. 6d. to £12 8s. 9d.

Woking District Gas Company.—In their report for the half year ended Dec. 31 (which was adopted at the meeting on Monday of last week), the Directors stated that the sales of gas showed an increase of 2·54 per cent. over the corresponding period of 1912, and the receipts from residual products an increase of £238. The revenue for the half year had been £10,137, and the expenses on revenue account £7687, leaving a net profit of £2450, to which must be added £1371 brought forward. After charging £308 interest on debentures and loans, and writing off £514 part cost of Special Act, there remained an available balance of £2998. Dividends were recommended at the rate of 5 per cent. per annum on the preference stock, and 5½ per cent. per annum on the "A" and "B" ordinary stocks, which would absorb £1610, leaving £1388 to be carried forward. It was pointed out that the make of gas was 12,094 cubic feet per ton of coal, which was a higher figure than for any previous half year.

The Maintenance of the IRONCLAD ends where it begins.

The IRONCLAD with Capsule Thermostat.

This may sound paradoxical, but it is absolutely true, for there is little or no maintenance with the IRONCLAD,

Because the IRONCLAD has VERTICAL Heat and Water Surfaces—eliminating deposit.

No interior baffles or other obstacles to complicate or impair working.

The finest IRON Castings without joints or seams.

Test the IRONCLAD. The first All Iron Circulator at a moderate price.

THE Richmond GAS STOVE & METER Co. LTD

WARRINGTON AND LONDON.

The FIVE PARTS of the IRONCLAD.

COAL TRADE REPORTS.

Northern Coal Trade.

The coal trade in the North has been steady, with good shipments, and the prices are maintained for prompt delivery. In the steam coal trade, best Northumbrians are from 13s. 6d. to 13s. 7½d. per ton f.o.b.; second-class steams are about 11s. 6d. per ton; and steam smalls are steady at 6s. 3d. to 7s. 6d. per ton f.o.b. The output is now fairly good, and large contracts for Scandinavia are pending. The gas coal trade now shows a lessened demand, though consumption is good for this season. Best Durham gas coals are about 13s. 6d. per ton f.o.b.; for second-class kinds the quotation is about 11s. 9d. to 12s. 3d. per ton; and Wear specials are firm at 13s. 6d. per ton f.o.b. One or two contracts for gas coal have been entered into, at prices that are below those now current. But the quantities are not very large; and the actual figures to be paid are modified by the lower freights now ruling and likely to be known over the summer, in contrast with those paid in the past season. It is believed that, in a few instances, contracts for foreign ports are being partly held back to allow of the advantage of lower sea freights being gained. A sale of gas coals for Naples is reported at about 12s. 4½d. per ton f.o.b. Coke is steady. The reduced make of gas coke also influences values. Good makes are about 13s. 6d. per ton f.o.b. in the Tyne.

Sale of Preston Gas Stock.—Messrs. E. J. Reed and Son sold last Wednesday, at Preston, £15,000 of 5 per cent. preference stock of the Preston Gas Company. It was offered in £100 lots, and the highest price realized was £126; the lowest, £120—the average being £122 2s. 8d. The result of the sale was a total of £18,320 7s. 6d.

Ottoman Gas Company.—At to-day's meeting of this Company it will be reported that the gas-rental for the second six months of 1913 amounted to £28,392 (for the corresponding half year it was £24,747). The net profit was £6374, compared with £3645. The amount standing to the credit of the profit and loss account is £11,470. The Directors recommend a dividend of 7 per cent. per annum on the preference shares, and of 10 per cent. on the ordinary shares (tax free), leaving a balance of £7976 to be carried forward.

Cheaper Gas for Power at Yorktown.—The welcome announcement was made by the Directors of the Yorktown and Blackwater Gas Company, in their annual report, that the price of gas supplied for power purposes has been reduced to 2s. 6d. per 1000 cubic feet, as from the beginning of the current quarter. After payment of interest on debentures and preference shares, and allowing for depreciation, there remained a balance of £10,346, out of which the Directors recommended the payment of dividends (with the interim dividends already paid) of 12¾ per cent. on the original shares and of £8 18s. 6d. per cent. on the additional shares. The gas consumption during the year increased by 3¾ million cubic feet, or practically 4 per cent.

Gas Maintains its Position at Crowle.—At the last meeting of the Crowle Urban District Council, a motion was proposed that steps should be taken to light the town by electricity; it being stated that all the tradesmen in the district were anxious for its adoption. On behalf of the Gas Company, Mr. Franks said he thought they would be glad to meet the Council in reference to the price of gas supplied to consumers. Mr. Wressell said he understood that incandescent gas lighting had proved a great saving in the district; there being a consumption of 280 cubic feet less per lamp than before. They had better light for less money. The motion was eventually defeated; only the proposer and seconder voting in its favour.

Why do Gas Officials go Abroad?—In connection with a statement in the Middleton Gas Committee's minutes that the resignation of the Gas Engineer (Mr. W. H. A. Chester), on his appointment to the position of Deputy-Engineer at Brisbane, had been accepted, Alderman Jackson, the Chairman of the Committee, said this was the third successive Gas Manager who had left the Middleton Corporation for appointments in the Colonies. He thought it was a striking answer to Lord Claud Hamilton's assertion that Britain could not produce men capable of managing large undertakings. Alderman Bentley asked if the Chairman could give an explanation as to why their officials went abroad, and several members cried by way of answer that the pay was better.

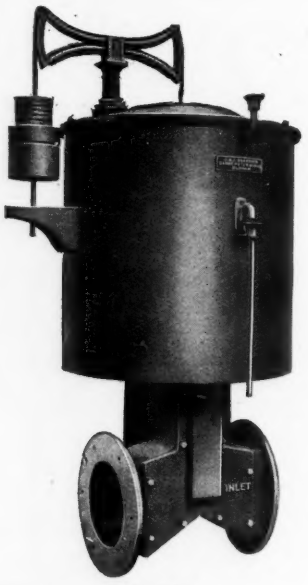
Westhoughton Gas Prices.—A deputation of the Westhoughton District Council recently waited on the Directors of the Gas Company, when Mr. Gleave stated that the Council had reason to believe that the price charged to the Council was not so low as that charged to some of their other customers. This was denied by the Company; and it was also stated on their behalf that if the Council insisted on being supplied with gas for lighting at as low a rate as was charged for power, the Company would have no option but to increase the price for power purposes. It was also stated at a Council meeting that the Secretary of the Company declined to inform the deputation as to the lowest price the Company had ever charged for power; and eventually the discussion was adjourned without a settlement being arrived at.

Gas Supply at Whitley Upper.—The ratepayers of the rural district of Whitley Upper, which lies between Huddersfield and Dewsbury, have held a meeting to consider the question of the public and private lighting. As the result of a generally expressed wish for extensive improvements, the Urban District Council have decided to open negotiations with the Dewsbury Corporation to attain this object. It was decided at a special meeting last Friday that an agreement should be drawn up with the Corporation, embodying the terms stated at an interview between the Gas Committees of the two bodies and in subsequent correspondence between the Chairman of the Council and the Gas Manager of the Corporation. Prior to this decision, negotiations had been opened by the Council with the Yorkshire Electric Power Company and the Kirkburton Gas Company. At present it is intended to erect 22 pillar lamps in the Grange Moor district.

BRADDOCK'S
RETORT-HOUSE
GOVERNORS
HAVE PROVED TO BE
SECOND TO NONE.

Many repeat orders have been received.

Braddock's New Patent Retort-House Governor is a further improvement and is especially desirable for use with Vertical Retorts.



No. 284.
Braddock's New Patent Enclosed Retort-House Governor, Latest Type.

Further Particulars upon Application.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), Globe Meter Works, OLDHAM.
Telegrams: "BRADDOCK, OLDHAM." National Telephone No. 815.
AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E.
Telegrams: "METRIQUE, LONDON." Telephone No. 2412 HOP.

Electric Light Failure in Dublin.—Work in many business offices in Dublin had to be suspended last Wednesday, owing to a breakdown of the city electrical supply. An intimation was received from the power house that the current would be restored in a few minutes; but it was over half-an-hour before it was available. The breakdown took place about 2.30 p.m.

Slot-Meter Robberies at Manchester.—At the Manchester Police Court last Wednesday, a labourer named William Heaney, of no settled residence, was sentenced to six months' hard labour for breaking open prepayment meters. The prisoner confessed to having committed over thirty meter robberies during the last few months. The Stipendiary Magistrate expressed regret that he could not give him greater punishment.

Churnet Valley Gas Company.—A Company with this title has been registered, with a capital of £20,000 in £1 shares, to take over lands at Froghall, Staffordshire, and erect thereon gas-works, and supply gas in Froghall, Ipstones, Kingsley, Oakamoor, Whiston, Alton, and Farley, and to adopt an agreement with Mr. G. H. Key. Mr. R. Hall, of Matlock, is the Secretary. The minimum cash subscription is put at 4000 shares.

The Denton Corporation Gas Department have placed a contract with Messrs. Biggs, Wall, and Co. for the installation at their gas-works of a "Rapid" manual charging machine.

The Local Government Board have sanctioned the borrowing by the Nelson Corporation of £26,000 for a vertical retort installation and other improvements at the Brierfield Gas-Works.

The Lady Mayoress of Leeds, Mrs. Charles F. Ratcliffe, the wife of the Managing-Director of Brotherton and Co., Limited, and niece of the Chairman, Mr. E. A. Brotherton, the Lord Mayor of the City, was last Friday presented at Court by Mrs. Dighton Probyn.

The Haddington Town Council have decided to instal the "A. & M." [Alder and Mackay] system of controllers upon the whole of the public gas-lamps for the next lighting season, and have arranged a contract with the Gas Company to light and extinguish and maintain the entire system.

In connection with a Health and Home Exhibition in Liverpool, arranged under the auspices of the "Daily Post" and "Echo," a series of cookery lectures and demonstrations by Mr. R. Gamble Marks were provided by the Liverpool United Gas Company. These proved highly successful; upwards of 8000 persons having been present at them. The exhibition remained open for a fortnight.

The National Amalgamated Union of Labour some time ago, on behalf of the lamplighters, made an application to the Newcastle and Gateshead Gas Company for an advance of 2s. per week. The Directors have agreed to an advance of 1s. per week; and this has been unanimously accepted by the men. This will make the wages 23s. for the first year, 24s. for the scond year, and 25s. thereafter.

The Directors of Glover and Main, Limited, have declared a dividend at the rate of 5 per cent. per annum for the six months ended Dec. 31 (making, with the interim dividend paid, 5 per cent. for the year) upon £50,000 of preference share capital; and a dividend at the rate of 10 per cent per annum for the six months (making, with the interim dividend paid, 7½ per cent. for the year) upon £200,000 of ordinary share capital.

The Chalk Fuel Power Gas and Bye-Products Corporation, Limited, has been registered with a capital of £16,000, in 60,000 preference shares of 5s. each and 20,000 founders' shares of 1s. each, to acquire and exploit any process for the manufacture of fuel and gas, particularly for the utilization of chalk or other substance in the production of fuel or power gas, and to carry on business as gas and chemical manufacturers, &c.

The Islington Guardians have received a letter from the Local Government Board stating that they are not at present satisfied that the proposal to instal electric light at the union institutions is one they could properly approve without further information. In view of this fact, and of the representations which the Board have received with regard to the offer made by the Gaslight and Coke Company, the Board have decided to hold an inquiry on the matter.

A Local Government Board inquiry was held last week at Burley-in-Wharfedale into an application by the Urban District Council to borrow £1400 for the installation of a system of mechanical water-filters to be put down at Burley Wood Head for dealing with the water, which is gathered from the moors. At present it is purified by lime at the inlet of the reservoir; but it is hoped with the new plant to obviate plumbo-solvent action, and render unnecessary the present regular scraping and flushing of the mains.

In their report for the twelve months ending Jan. 31, the Directors of C. & W. Walker, Limited, state that the profit—after charging for Directors' fees and depreciation on buildings and plant, and strengthening the contingent reserve—amounted to £15,607. After adding the balance brought forward from the previous year, there is a sum for disposal of £24,349, which the Board recommend should be dealt with as follows: £3100 to meet the interim dividends already paid, and a similar sum for the completion of the dividends for the year at the rate of 5½ per cent. on the preference shares and 10 per cent. on the ordinary shares; £2000 to provide a bonus of 1s. per share (ordinary), free of income-tax; £5000 to the reserve fund—making it £33,000; and £11,149 carried forward. The report concludes: "Encouraged by the results already obtained, owing to recent improvements in the works, and the steady increase in business resulting therefrom, the Directors contemplate further re-organization and extension of the plant and machinery. To meet the necessary outlay, the Board propose a further issue of capital, particulars of which will be submitted to the shareholders in due course."

YOUR

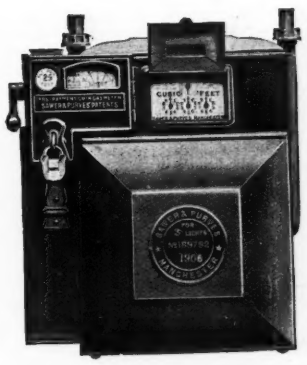
ATTENTION

DIRECTED TO

THE POSITIVE

PREPAYMENT METER

FIRST 1889. FOREMOST 1914.



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SAWER & PURVES

THE PEOPLE

WITH EXPERIENCE.

MILES PLATTING, MANCHESTER & RADFORD ROAD, NOTTINGHAM.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

SOLE AGENTS (Continental Firm). No. 5857.
DRAUGHTSMAN. R. & J. Dempster, Manchester.
ASSISTANT DRAUGHTSMAN. No. 5860.
JUNIOR CHEMIST. Nechells Gas-Works, Birmingham.
CLERK. Cheltenham Gas Company. Applications by March 25.
CLERK. No. 5861.
RETORT SETTER. No. 5859.

Appointments, &c., Wanted.

LEADBURNER, &c. No. 5862.

Pupil.

GAS ENGINEERS AND CONTRACTORS. No. 5853.

Gas-Works Wanted.

"D. G.," c/o SCRIPPS'S Advertising Offices, 18, South Molton Street, W.

Plant, &c. (Second-Hand), for Sale.

RETORTS. Newcastle Gas Company.
STEEL BUILDING. "G.," Titan Works, Charles Henry Street, Birmingham.

Patent Licence, &c.

GASHOLDER. W. P. Thompson, 6, Lord Street, Liverpool.

Meeting.

BRITISH GASLIGHT COMPANY. No. 11, George Yard, Lombard Street, E.C. March 25. Twelve o'clock.

Sales of Stocks and Shares.

AYLESBURY GAS COMPANY. London Mart. March 31.
DORKING GAS COMPANY. London Mart. March 31.
PORTSEA ISLAND GASLIGHT COMPANY. By Tender. March 26.
ROCHESTER, &c., GAS COMPANY. London Mart. March 31.
SUTTON GAS COMPANY. London Mart. March 31.

TENDERS FOR

Coal.

TONBRIDGE GAS COMPANY. Tenders by March 26.

Coke.

WANDSWORTH, &c., GAS COMPANY. Tenders by March 27.

Fire-Clay Goods, &c.

LIMERICK GAS DEPARTMENT. Tenders by March 23.
STOCKPORT GAS DEPARTMENT. Tenders by March 23.
TRALEE GAS DEPARTMENT.

General Stores (Brass Fittings and Castings, Iron and Steel, Drysaltery, Ironmongery, Glass and Putty, Mill Furnishing, Oils, Shovels, &c., Bolts and Nuts, Brushes, Tubing, Lime, &c.).

STOCKPORT GAS DEPARTMENT. Tenders by March 23.

Meters.

STOCKPORT GAS DEPARTMENT. Tenders by March 23.

Oxide

LIMERICK GAS DEPARTMENT. Tenders by March 23.

Retort Ironwork.

LIMERICK GAS DEPARTMENT. Tenders by March 23.

Tar and Liquor.

MARPLE GAS DEPARTMENT. Tenders by March 24.

GAS COMPANIES IN THE STOCK EXCHANGE.

The same sinister factors as in the preceding week were very much to the front last week in the Stock Exchange, but their malignity was moderated. Business, however, was much reduced in volume; the public seemingly having prudently made up their minds to "wait and see" how the proverbial cat was going to jump. Operations, therefore, were to a large extent professional, and there were quick changes as the wind shifted to a more or less favourable quarter. But the end of the week was quite cheerful; markets finishing up with strength, and Consols showing a gain of $\frac{3}{8}$ in the six days. The opening on Monday showed quiet business with very sensitive markets (as might well be expected after such a trying close as that of the previous Saturday); and those which were not decidedly weaker were uneven. Gilt-edged descriptions were flat on political grounds and on money movements, and Consols fell $\frac{1}{4}$. Rails fell, though some covering purchases helped them later. Some reassuring statements in regard to recent alleged inaccurate returns aided American. Foreign were much dashed by Brazil. Tuesday brought a rift in the clouds, ascribed to a ray of sunshine afforded by the Premier's Ulster speech, and prices rose in several quarters. Consols rose $\frac{1}{4}$ for money and $\frac{1}{2}$ for the account. Rails were strong, and Transatlantics did pretty well. Wednesday was dead quiet, but operators still found some crumbs of comfort to pick up out of the hurly-burly of affairs. So gilt-edged had a lift, and Consols rose $\frac{1}{4}$. Rails were helped up by good traffics; but in American there was somewhat of a tug-of-war, and the "bears" got the best of it. Foreign receded in company with Continental bourses. On Thursday, things were much worse. All the evil agencies were in action—Mexico, Brazil, and the rest. Every market was flat, with the Continent realizing hard, and buyers few and far between. Friday's opening promised very disagreeably, liquidation was in full swing, and everything went lower. But presently the selling stopped; and then a recovery set in, and the best use was made of it. In result, Consols gained $\frac{1}{4}$. Saturday was quite cheerful and confident, and operators were buying back. All markets looked up, and Consols rose $\frac{1}{4}$ for money and $\frac{1}{2}$ for the account. In the Money Market, there was a full supply, and rates, after some hesitation, closed rather easier. Business in the Gas Market was no better than a moderate average, and pretty well half of it was in the issues of the premier Company. However, prices did not suffer, and a small number of quotations advanced. In Gas Light and Coke, the ordinary was fairly busy at about the same figures as the week before; transactions ranging from 100$\frac{1}{2}$ to 101$\frac{3}{4}$. In the secured issues, the preference made 97, and the debenture 73$\frac{3}{4}$ and 74$\frac{1}{4}$. South Metropolitan was quiet and unchanged; dealings being marked at 110 to 111$\frac{1}{2}$. In Commercials, the 4 per cent. realized 107, and the 3$\frac{1}{2}$ per cent. 104$\frac{1}{2}$ to 105$\frac{1}{2}$. Among the Suburban and Provincial group, Bournemouth "B" changed hands at 14$\frac{11}{16}$, Brentford new at 204 and 205, British at 45$\frac{1}{2}$, North Middlesex at 13$\frac{1}{8}$ and 13$\frac{1}{4}$, South Suburban at 115, Wandsworth "B" at 129, Tottenham "A" at 137$\frac{3}{8}$, and ditto "B" at 115$\frac{1}{2}$. On the local Exchange, Liverpool "A" fetched 209 (a rise of 3), ditto "B" 143, and ditto debenture 100—a rise of 1. In the Continental companies, Imperial was done at 174$\frac{1}{2}$ to 175$\frac{1}{2}$, and Union at 80$\frac{1}{2}$. Among the undertakings of the remoter world, Cape Town was 1 lower at 1$\frac{1}{2}$, Melbourne fetched 100$\frac{1}{8}$ (a rise of 1), Primitiva 6$\frac{1}{2}$ to 6$\frac{3}{4}$, and ditto preference 5 to 5$\frac{1}{2}$.

OFFICIAL QUOTATIONS AT THE CLOSE OF THE WEEK.

Bank Rate (fixed January 29), 3 per cent. Last year, 5 per cent. Consols, 75$\frac{1}{4}$—75$\frac{3}{4}$. Previous week, 74$\frac{1}{2}$—75.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Oct. 15	4	Alliance & Dublin Ord.	62–65	+1½	6 3 1
374,000	,,	Jan. 15	4	Do. 4 p.c. Deb.	78–81	..	4 12 9
280,000	5	Oct. 15	7½	Bombay, Ltd.	6–6¼	..	5 15 5
50,000	10	Feb. 26	16	Bourne- 10 p.c.	27⅞–28⅜	..	5 11 4
352,500	10	,,	7	mouth Gas B 7 p.c.	14¼–15	..	4 18 4
75,000	10	,,	6	and Water Pref. 6 p.c.	13¾–14	..	4 5 9
380,000	Stk.	Feb. 26	14	Brentford Consolidated	256–261	..	5 7 3
330,000	,,	,,	11	Do. New	202–207	..	5 6 3
50,000	,,	,,	5	Do. 5 p.c. Pref.	109–111	..	4 10 1
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	93–95	..	4 4 3
217,380	Stk.	Feb. 26	11	Brighton & Hove Orig.	196–201	..	5 9 5
244,200	,,	,,	8	Do. A Ord. Stk.	145–148	..	5 8 1
530,000	20	Sept. 26	12½	British	45–46	..	5 8 8
120,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. Stk.	90–92	..	4 7 0
245,771	Stk.	,,	4	Buenos Ayres 4 p.c. Deb.	89–91	..	4 7 11
100,000	10	—	—	Cape Town & Dis., Ltd.	1–2	−1	—
100,000	10	—	—	Do. 4½ p.c. Pref.	2¾–4¼	..	—
100,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	75–78	..	5 15 5
157,150	Stk.	Feb. 26	5	Chester 5 p.c. Ord.	106½–108½	..	4 12 2
1,513,280	Stk.	Feb. 12	5/9/4	Commercial 4 p.c. Stk.	105½–107½	..	5 1 7
560,000	,,	,,	5½	Do. 3½ p.c. do.	103½–105½	..	5 1 1
475,000	,,	Dec. 11	3	Do. 3 p.c. Deb. Stk.	71–73	..	4 2 2
800,000	Stk.	,,	4½	Continental Union, Ltd.	80–83	..	5 8 5
200,000	,,	,,	7	Do. 7 p.c. Pref.	117–122	..	5 14 9
492,270	Stk.	—	6	Derby Con. Stk.	123–125	..	4 16 0
55,000	,,	—	4	Do. Deb. Stk.	102–104	..	3 16 11
1,002,180	10	Jan. 15	10	European, Ltd.	17⅛–18⅛	..	5 8 1
16,386,660	Stk.	Feb. 12	1/17/4	Gas- 4 p.c. Ord.	100–102	..	4 15 6
2,600,000	,,	,,	3½	light 3½ p.c. max.	75–79	..	4 8 7
4,062,235	,,	,,	4	and 4 p.c. Con. Pref.	95–98	..	4 1 8
4,674,850	,,	Dec. 11	3	Coke 3 p.c. Con. Deb.	73–75	..	4 0 0
258,740	Stk.	Mar. 12	5	Hastings & St. L. 3½ p.c.	87–89*	..	5 12 4
70,000	10	Oct. 15	11	Hongkong & China, Ltd.	16⅜–17⅛	..	6 7 6
131,000	Stk.	Mar. 12	7½	Ilford A and C	147–150*	+3	5 1 8
65,780	,,	,,	6½	Do. B	115–118*	+½	5 3 10
65,500	,,	Dec. 30	4	Do. 4 p.c. Deb.	89–91	..	4 7 11
4,940,000	Stk.	Nov. 13	9	Imperial Continental	173–178	..	5 1 1
1,285,000	Stk.	Feb. 12	3½	Do. 3½ p.c. Deb. Red.	83½–85½	..	4 1 10
200,242	Stk.	Mar. 12	6½	Lea Bridge Ord. 5 p.c.	115–118*	..	5 10 2
561,000	Stk.	Feb. 26	10	Liverpool United A	209–211	+3	4 14 9
718,100	,,	,,	7	Do. B	141½–143½	..	4 17 7
306,083	,,	Dec. 30	4	Do. Deb. Stk.	99–101	+1	3 19 8
63,480	Stk.	Dec. 30	8	Maidstone 8 p.c. Deb.	65–67	..	4 9 7
75,000	5	Dec. 11	6	Malta & Mediterranean	4⅜–4⅝	..	6 3 1
250,000	100	Oct. 1	4½	Met. of Melbourne 4½ p.c. Deb.	99–101	+1	4 9 1
541,920	20	Nov. 27	4	Monte Video, Ltd.	11⅜–12½	..	6 10 8
1,775,892	Stk.	Feb. 26	4½	Newc'tle&G'tesh'd Con.	99½–100½	−½	4 9 7
529,705	Stk.	Dec. 30	2½	Do. 3½ p.c. Deb.	83–84	+1	4 3 4
55,940	10	Feb. 26	7/14.0	North Middlesex 7 p.c.	12½–13½	..	5 14 1
300 000	Stk.	Nov. 27	8	Oriental, Ltd.	120–125	..	6 8 0
60,000	5	Sept. 26	10	Ottoman, Ltd.	7⅛–7⅜	..	6 9 0
60,000	50	Feb. 26	13	Portsea, Island B	127–130	..	5 0 0
100,000	50	,,	12	Do. C	118–121	..	4 19 2
249,980	5	Oct. 15	8	Primitiva Ord.	6½–7	..	5 14 4
499,960	5	Dec. 30	5	,, 5 p.c. Pref.	5–5¼	..	4 15 3
521,600	100	Dec. 1	4	,, 4 p.c. Deb.	93–95	..	4 4 3
346,198	Stk.	Dec. 30	4	River Plate 4 p.c. Deb.	87–89	..	4 9 11
275,000	5	Sept. 26	12	San Paulo, Ltd.	—	..	—
150,000	10	,,	6	Do. 6 p.c. Pref.	10⅞–11⅜	..	5 5 6
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.	48–50	..	5 0 0
135,000	Stk.	Aug. 28	10	Sheffield A	225–227	..	4 8 1
209,984	,,	,,	10	Do. B	225–227	..	4 8 1
523,500	,,	,,	10	Do. C	225–227	..	4 8 1
90,000	10	Oct. 15	7½	South African	10½–11½	..	6 10 5
6,429,895	Stk.	Feb. 12	5/9/4	South Met., 4 p.c. Ord.	110–112	..	4 17 7
1,895,445	,,	Jan. 15	8	Do. 3 p.c. Deb.	73–75	..	4 0 0
209,820	Stk.	Feb. 26	8½	South Shields Con. Stk.	155–157	..	5 8 3
952,795	Stk.	Feb. 26	6	S'th Suburb'n Ord. 5 p.c.	114–116	..	5 3 5
60,000	,,	,,	5	Do. 5 p.c. Pref.	110–112	..	4 9 3
117,058	,,	Dec. 30	5	Do. 5 p.c. Deb. Stk.	113–115	..	4 6 11
594,740	Stk.	Nov. 13	5	Southampton Ord.	101–104	..	4 16 2
120,000	Stk.	Feb. 12	7⅛	Tottenham A 5 p.c.	195–188	..	5 6 10
543,940	,,	,,	5⅛	District B 3½ p.c.	114–116	..	5 1 3
149,470	,,	Dec. 30	4	4 p.c. Deb.	89–91	..	4 7 11
182,380	10	,,	5	Tuscan, Ltd.	5–6	..	8 6 8
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	95–97	..	5 3 1
236,476	Stk.	Mar. 12	5	Tynemouth, 5 p.c. max.	108½–110½*	..	4 10 6
				Wandsworth, Wimbledon, and Epsom—			
30.000	Stk.	Feb. 26	8⅜	Wandsworth A 5 p.c.	151–156	..	5 7 4
255,636	,,	,,	6⅝	,, B 3½ p.c.	129–134	..	5 2 7
108,075	,,	,,	5/17/8	,, C 3½ p.c.	110–115	..	5 2 0
352,000	,,	,,	6¼	Wimbledon 5 p.c.	108–113	..	5 8 3
98,000	,,	,,	6⅝	Epsom 5 p.c.	112–117	..	5 13 3
88,416	,,	Dec. 30	3	3 p.c. Deb. Stk.	71–73	..	4 2 2

Prices marked * are "Ex Div."